15c

The OIL WEEKLY

OIL and GAS ENGINEERING

INTERNATIONAL AUTHORITY FOR THE PRODUCING AND PIPE LINE INDUSTRY

THE WEEK'S NEWS INTERPRETED

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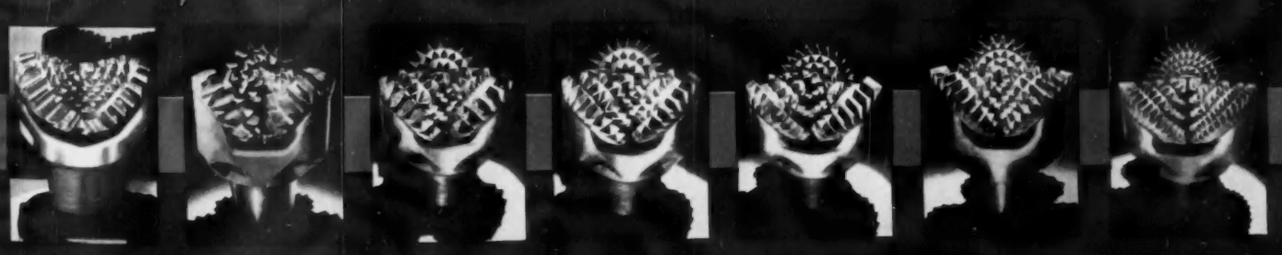

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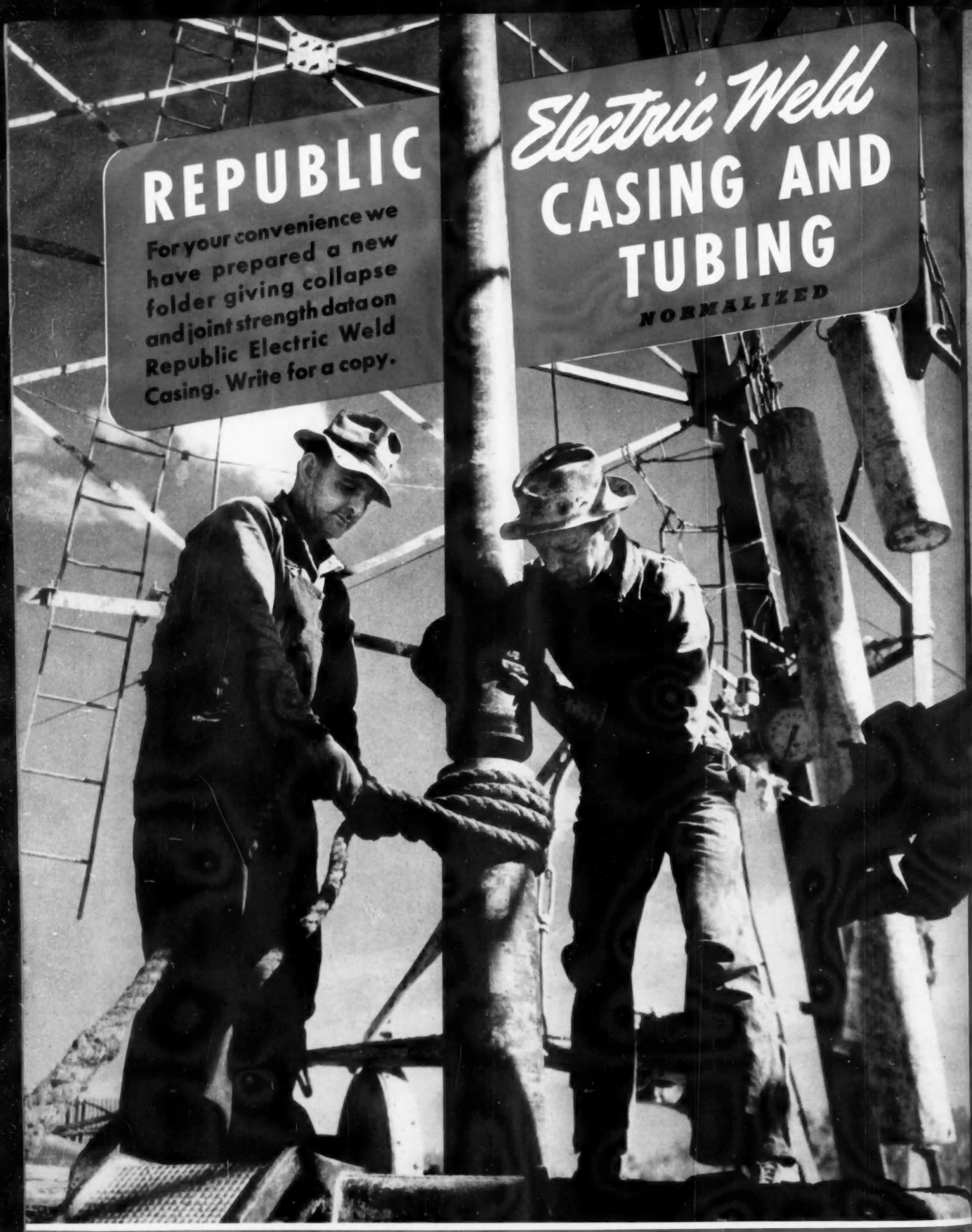
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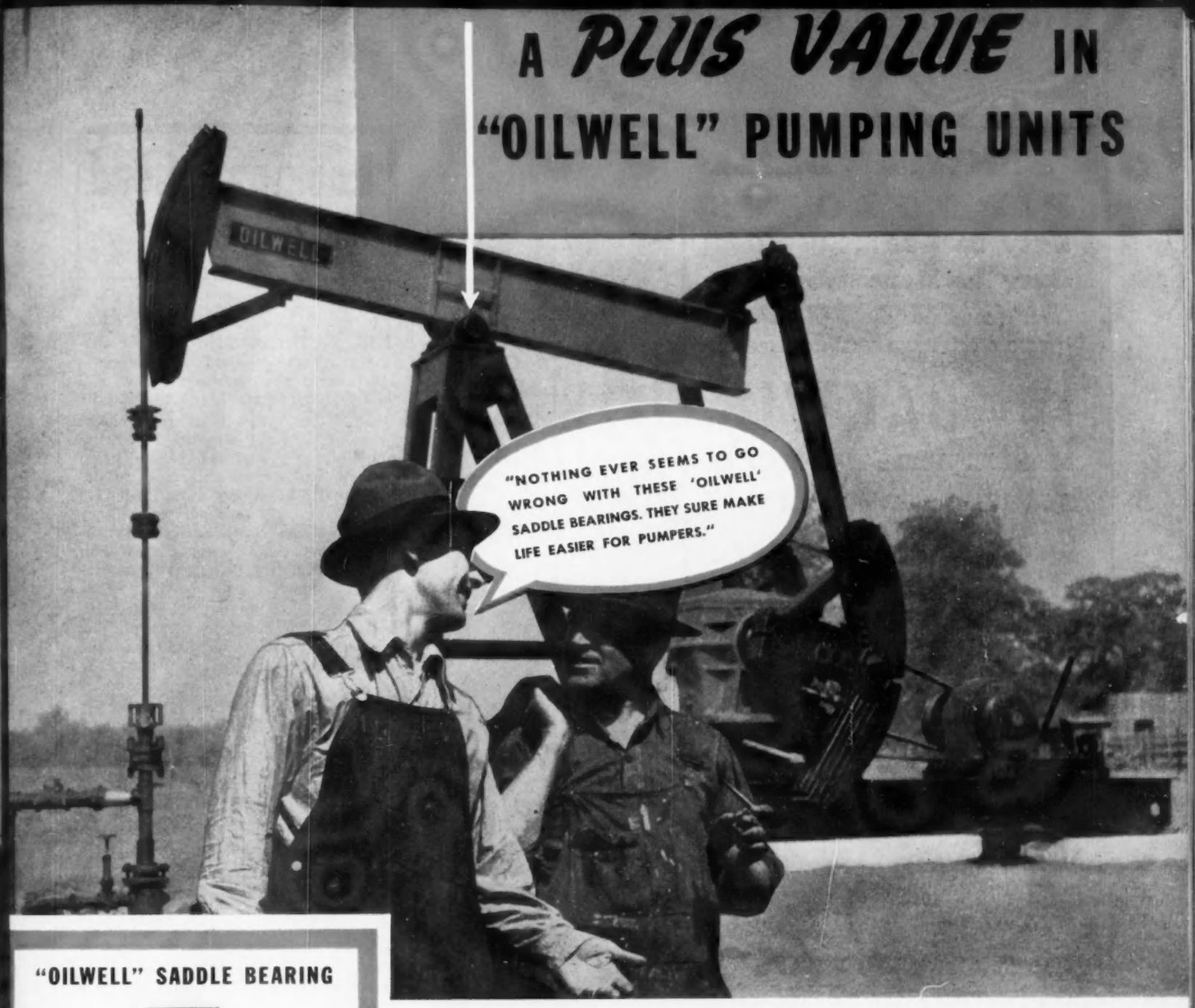
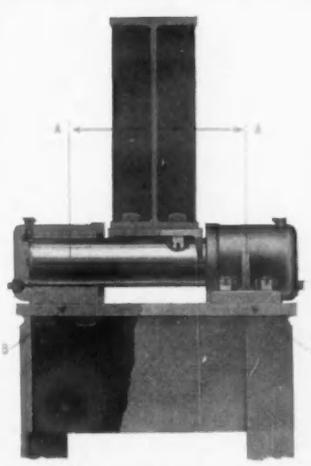
NILES STEEL PRODUCTS DIVISION
STEEL AND TUBES DIVISION
UNION DRAWN STEEL DIVISION
TRUSCON STEEL COMPANY

A *PLUS VALUE* IN "OILWELL" PUMPING UNITS



"OILWELL" SADDLE BEARING



A Wide spacing of bearings.

B Machined bases of the bearing housings rest on machined top of samson post.

TROUBLE-FREE SADDLE BEARINGS

SADDLE BEARINGS in "Oilwell" pumping units are designed for trouble-free performance and long life. They are fully-enclosed, oil-bath, bronze-bushed bearings with oil seals making them dust-proof and weather-proof.

Machined-base bearing housings and machined-top samson post assure accurate alignment.

Widely spaced bearings resist twisting, minimizing bearing wear.

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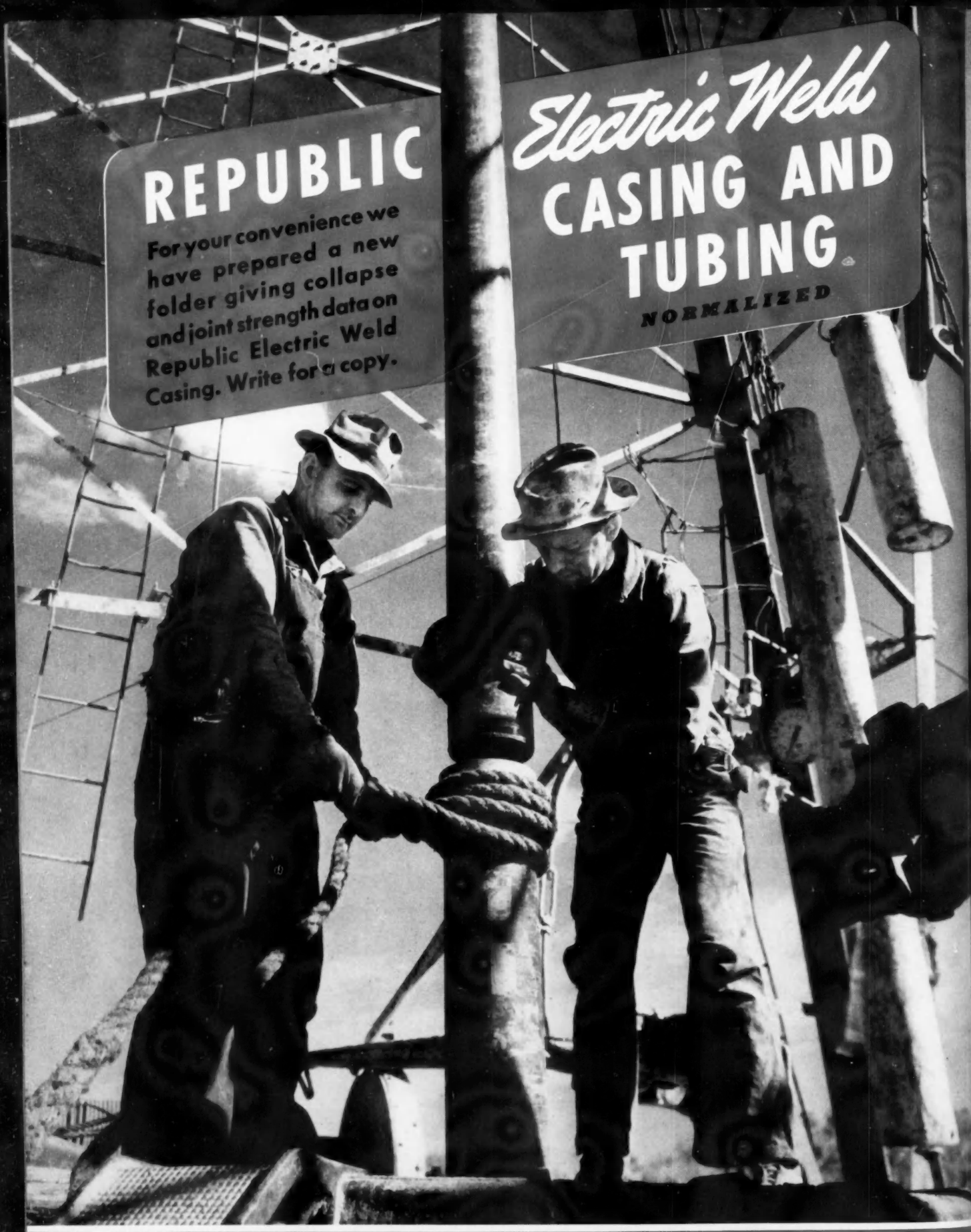
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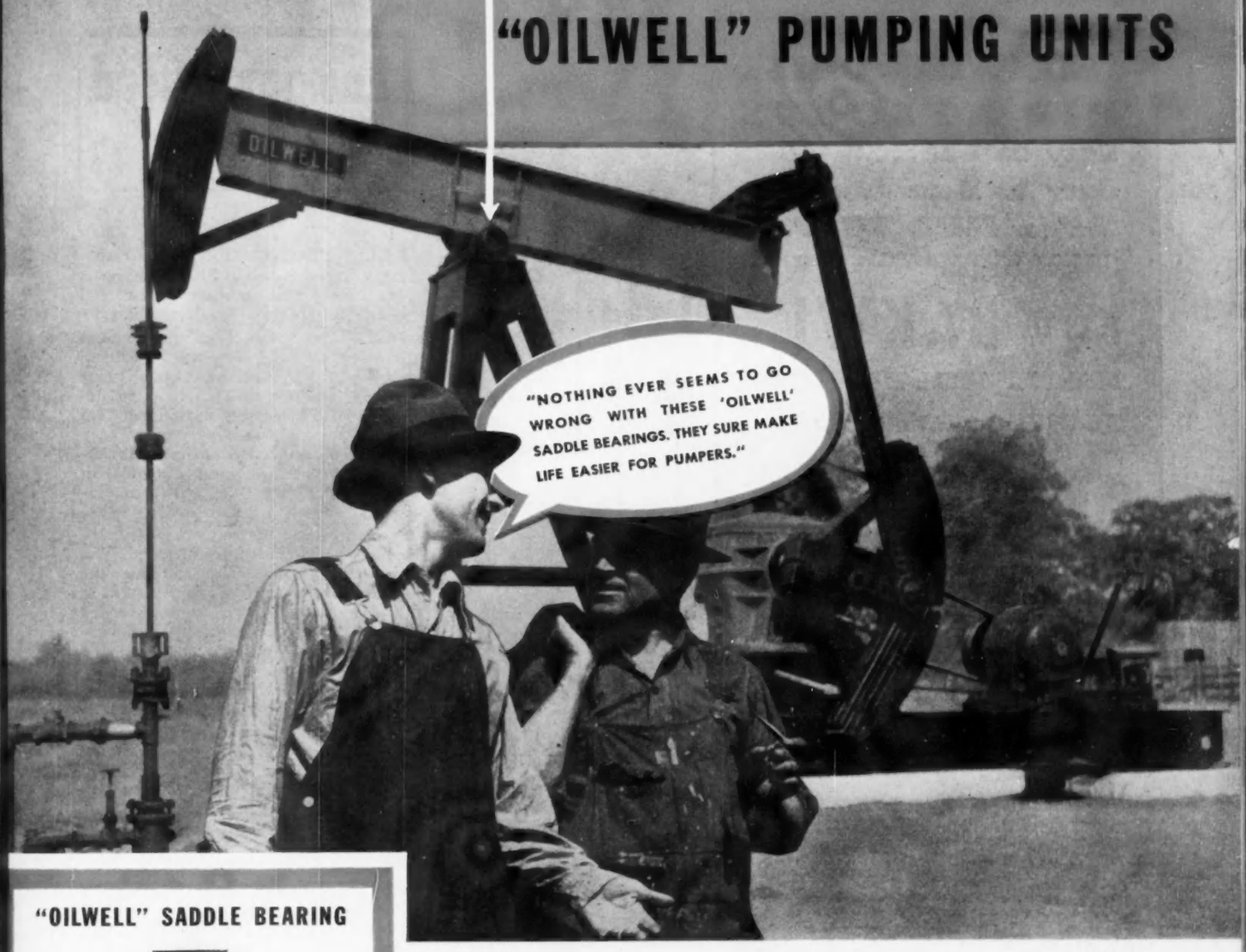

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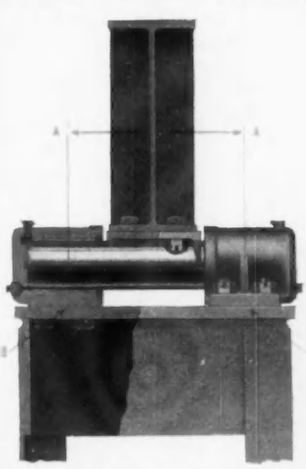

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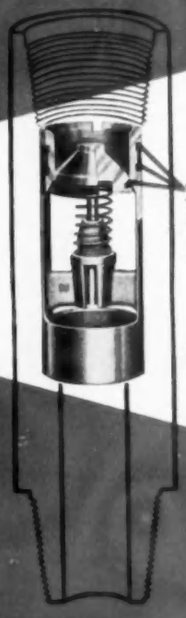

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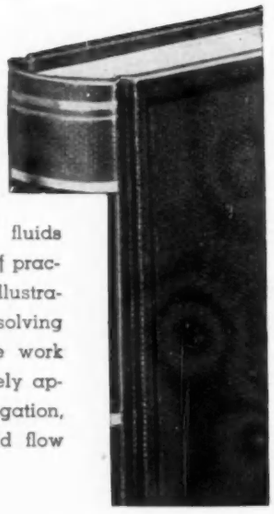
ANALYTIC METHODS FOR SOLVING FLOW PROBLEMS



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Looking Ahead
WITH THE EDITOR

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While one branch of government threatens to prosecute the petroleum industry for violations of anti-trust statutes, another makes ready to demand that all industry draw itself into drastic monopoly as a part of military defenses. The inconsistencies of Washington can be no better drawn than this prospect for the petroleum industry.

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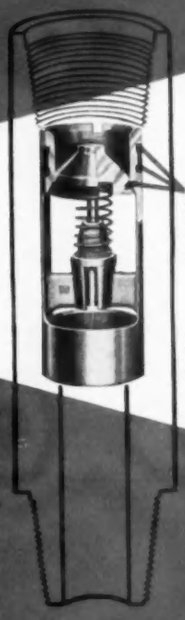

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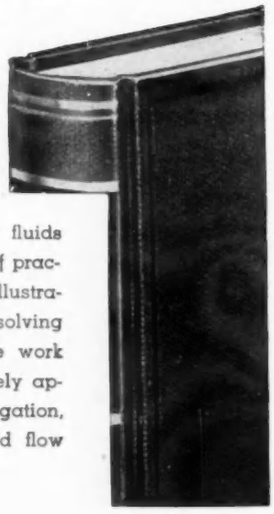

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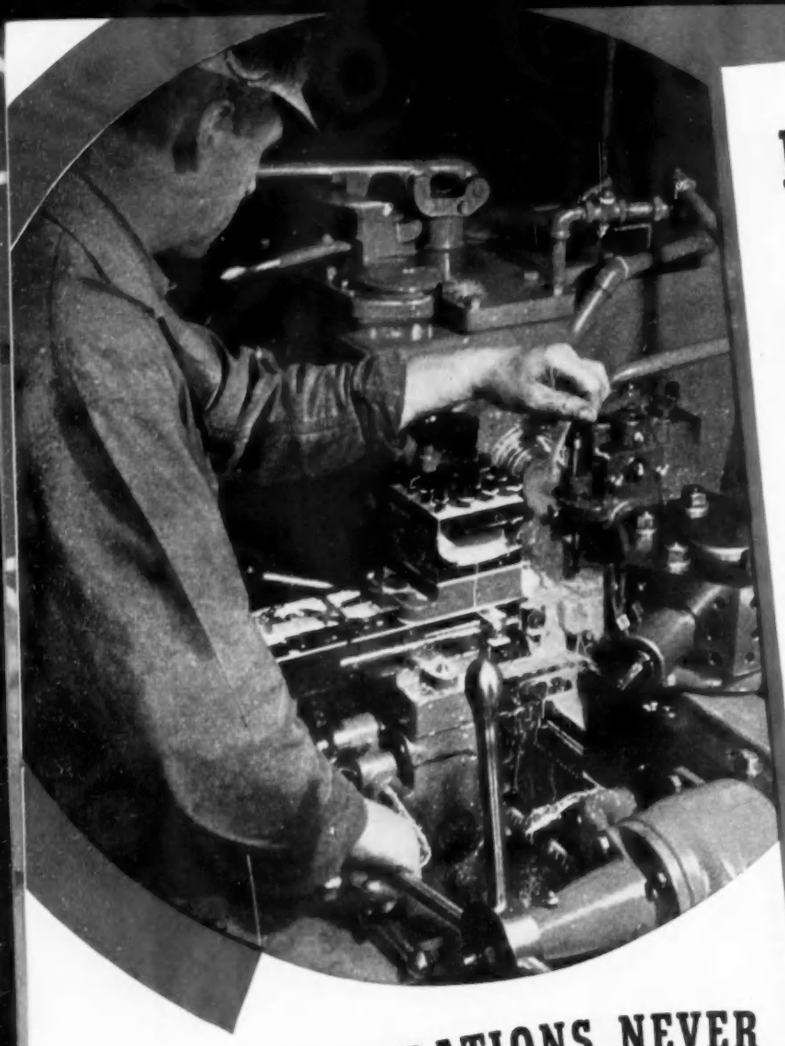

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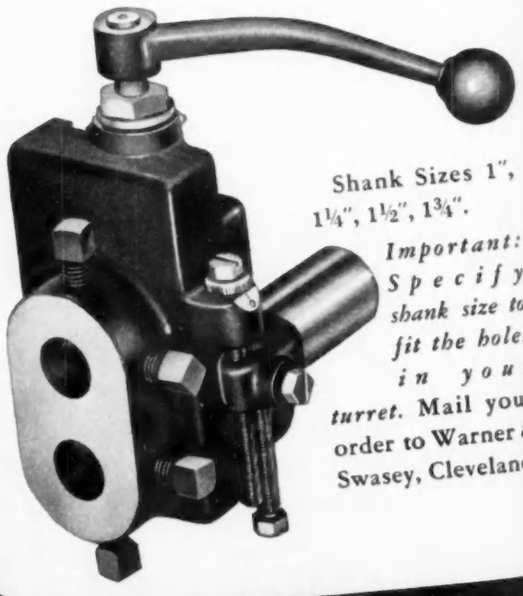

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THE OIL WEEKLY

JUNE 10, 1940

VOLUME 98 NUMBER 1

The Week's Panorama

REFLECTING now the recent reductions in the states of the Pacific Coast region, retail gasoline prices are the lowest for years. Prices to dealers average about ½ cent a gallon less than at this time last year.

• • • The present low prices of gasoline reflect surplus stocks and lagging demand, with exports down sharply. Storage was increased contra-seasonally in the week ended June 1, having expanded 56,000 barrels to 100,353,000 barrels. That quantity was more than 16,000,000 barrels, or 19.4 percent, greater than the over-large stocks of 84,070,000 barrels held on the corresponding date last year.

• • • The silver lining behind the dark cloud of undiminishing gasoline stocks is the current build-up of heating oil inventories. Addition of 1,177,000 barrels of the light fuel oils to storage in the week ended June 1 placed the national inventory 5.7 percent above the level of the corresponding time last year. Until a few weeks ago, stocks were under the comparable levels of 1939, in the face of materially expanded demand.

Continuation of exceptionally large additions to storage will be needed if the industry is to reach the beginning of the fall-winter season with adequate stocks of heating oils. And unless a comparatively large inventory is accumulated, the industry will be forced again to overproduce gasoline during the winter in meeting the market requirements for the burning oils.

• • • Illinois is ceasing to cause serious anxiety in the industry, as the state appears to be on the way out as a market disturber. Crude production hangs around 435,000 barrels daily and offers no indication of equaling again the peak of 456,800 barrels a day that was reached in the week ended March 16, for few new fields are being found to compensate for the decline of flush production from the Devonian lime at Salem.

• • • Consequently, the market for Illinois crude is changing from a buyer's market to a seller's market. The transformation was evidenced by the recent increases of 5 to 15 cents a barrel in postings in several areas in southern Illinois and Indiana.

• • • Pipe line capacity for handling Illinois crude has been expanded to about 450,000 barrels daily and exceeds the present, reduced capacity of the state to produce. Producing companies now have ready market, therefore, for all the oil they can turn out; and in some instances, concerns have removed restrictions on wells heretofore pinched in for lack of market demand.

• • • Considerable wildcatting is in progress in Illinois, as exploration has been stimulated by the decline of established fields. But results have been unimpressive, and some geologists are of the opinion that the best of the state's fields already have been found.

• • • Ominous clouds hang over the oil industry's niche in sunny California. Earnings of oil companies will suffer in consequence of the drastic reductions recently in retail gasoline prices throughout the Pacific Coast region. And there are some fears that the depressed gasoline prices will force further reductions of crude price postings in California. The gasoline cut averaged about 1¾ cents a gallon and made crude oil less valuable to the refiner by about 20 cents a barrel. It is indicated, therefore, that many West Coast refiners henceforth will show very slim margins of profit on their operations, if not losses.

• • • It is to be expected that drilling will be discouraged in California by the depressed gasoline market and the threat of lower crude prices.

• • • Beneath the surface, however, there is a force that is being exerted gradually toward a strengthening of the California crude market. It is the lagging of oil field discoveries in the state this year. California regularly dips into its crude reserves for over 200,000,000 barrels of oil annually. Consequently, a similar quantity, equivalent to one or several important fields, must be discovered each year to prevent diminution of the state's reserve. Yet comparatively little new oil has been found this year, despite considerable exploratory drilling.

• • • The proposal in Congress to increase the federal tax on gasoline from 1 cent to 1½ cents a gallon would raise about $100,000,000 annually to apply on the contemplated national defense program.

Surplus Gasoline and Smaller Exports Handicap Industry

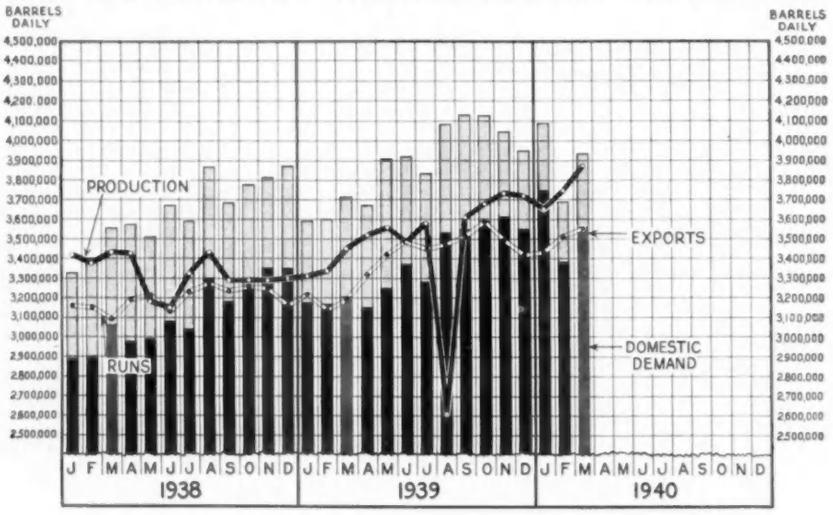
By L. J. LOGAN, Associate Editor

CONDITIONS in the oil industry have become progressively less satisfactory since the beginning of this year, and unfavorable developments have been emphasized in the past several weeks by declines in prices of crude and refined oils.

Confronted with a "strange" war abroad, which has not conformed with any preconceived patterns, and with a resultant uncertain domestic situation, the industry has been handicapped by exceptional difficulty in planning its operations and in controlling its inventories.

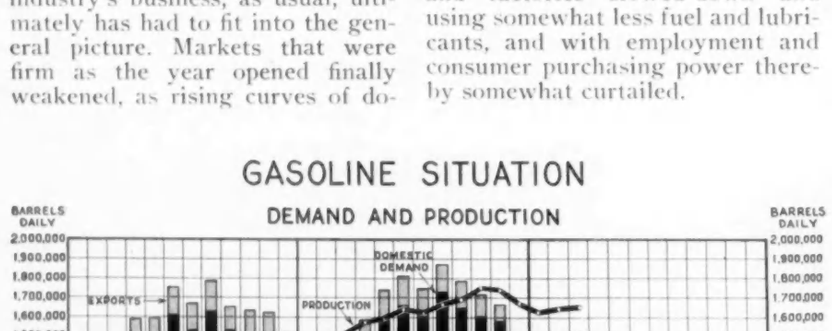
Whereas the European war originally was expected to stimulate exports of oils, it actually has caused a sharp curtailment of shipments. Domestic business in general expanded greatly after outbreak of the war, but it went into the new year on a downtrend that has not yet definitely changed. And the oil industry's business, as usual, ultimately has had to fit into the general picture. Markets that were firm as the year opened finally weakened, as rising curves of domestic demand flattened, with mills and factories slowed-down and using somewhat less fuel and lubricants, and with employment and consumer purchasing power thereby somewhat curtailed.

DEMAND FOR ALL U.S. OILS - CRUDE OIL PRODUCTION - REFINERY RUNS

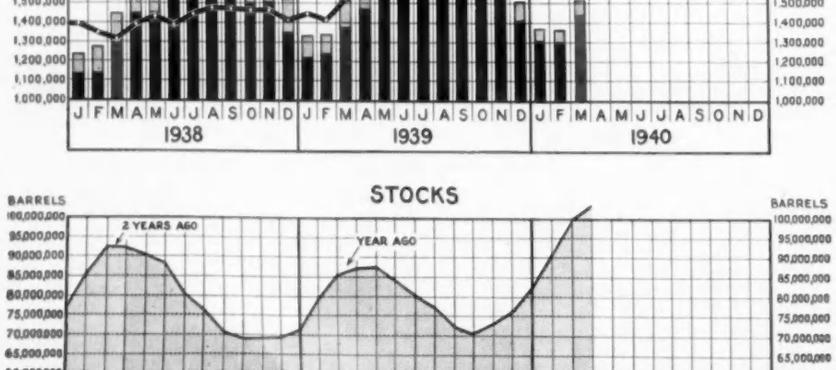


GASOLINE SITUATION

DEMAND AND PRODUCTION



STOCKS



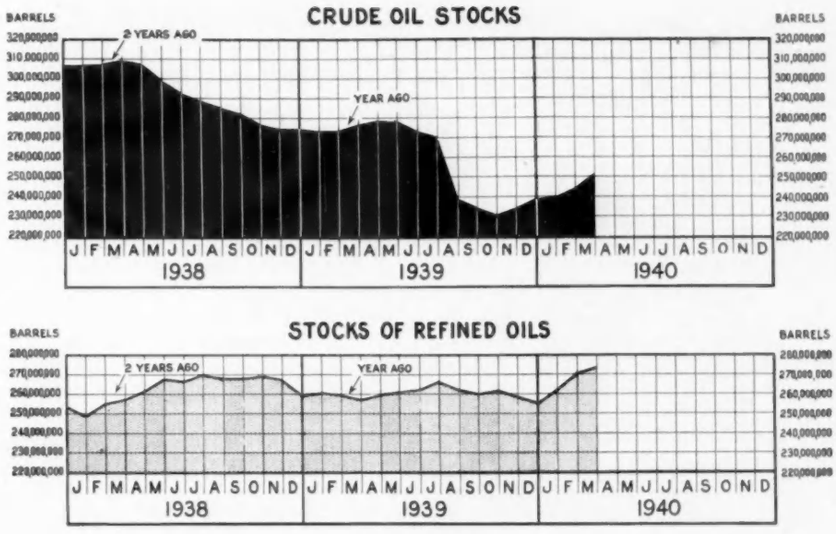
Meanwhile, special circumstances have added complications for the oil industry. The coldest winter for years, coupled with sharply increased numbers of oil burners in use, resulted in scarcity of light fuel oils east of California; and the industry was obliged to boost refinery output of that product to proportions that required surplus production of gasoline, which accumulated in storage and became a burden that still must be carried. From the rushing business in heating oil the industry has inherited an extremely weak market for gasoline, present prices of that principal product being among the lowest on record, as unprecedented stocks threaten to prolong unsatisfactory market conditions.

Over-refining and surplus production of gasoline have been encouraged this year, moreover, by the production of crude oil in excess of current market requirements. There has been overproduction of crude not only in unprorated Illinois but also in some of the prorated states, where allowables have been set substantially above indicated demand. In the first four months of this year, 20,000,000 bar-

rels of crude oil accumulated in storage, despite the charging of record-breaking quantities to refinery stills. And naturally, the large supplies available at wells were conducive to excessiye runs.

Fortunately for the economic welfare of the industry, the restrictions on crude production lately have been tightened, allowables having been made stricter in May and even more so in June. Consequently, surplus crude production no longer is a handicap.

Some constructive effort is being put forth, also, toward alleviating the burden of surplus gasoline stocks, the remedy that is being applied being the taking of exceptionally low yields of gasoline from crude at the refineries and the stepping up coincidentally of yields of light fuel oils, in precaution against scarcity of those oils again next fall and winter. In March, 1940, latest month for which figures are available, the average yield of gasoline was down to 42.2 percent, compared with 44.4 percent in March, 1939; and the average yield of gas oil and distillate fuel oil was up to 14.8 percent, compared with 13.7 percent in March, 1939.


CRUDE OIL STOCKS
BARRELS
2 YEARS AGO
YEAR AGO
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1938
1939
1940
STOCKS OF REFINED OILS
BARRELS
2 YEARS AGO
YEAR AGO
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1938
1939
1940

Similarly, the yields of gasoline in February and January of this year were materially lower than in the corresponding months a year previously, while the yields of light fuel oils were substantially larger.

An accompanying table shows how the yields of gasoline in the first three months of this year compared with those in corresponding months of other recent years, and also how the yields have run in the remaining months of each year.

Month—	Percent Yield of Gasoline 1937	1938	1939	1940
January	43.2	44.1	44.8	42.9
February	45.0	42.8	45.0	42.4
March	44.5	42.6	44.4	42.2
April	44.6	43.6	44.8	...
May	43.9	44.2	44.4	...
June	43.5	44.3	44.5	...
July	43.2	44.7	44.5	...
August	43.2	44.1	45.1	...
September	45.3	45.3	45.1	...
October	44.6	44.9	45.3	...
November	44.0	45.0	45.8	...
December	43.9	44.4	45.0	...
Year	43.9	44.3	44.9	...

Also tabulated herewith are the yields of light fuel oils in the first three months of this year and in every month of other recent years.

Month—	Percent Yield of Gas Oil and Distillate Fuel Oils 1937	1938	1939	1940
January	14.1	14.2	14.2	15.5
February	13.2	13.8	14.6	16.0
March	11.7	12.8	13.7	14.8
April	11.4	12.1	13.4	...
May	11.1	12.2	11.7	...
June	11.2	11.5	12.9	...
July	12.1	12.7	11.9	...
August	11.9	12.5	12.3	...
September	12.3	13.5	12.3	...
October	12.9	13.7	13.5	...
November	13.3	13.1	13.1	...
December	13.8	14.2	13.6	...
Year	12.4	13.0	13.1	...

These figures show that the industry has been achieving a degree of success in adjusting yields of

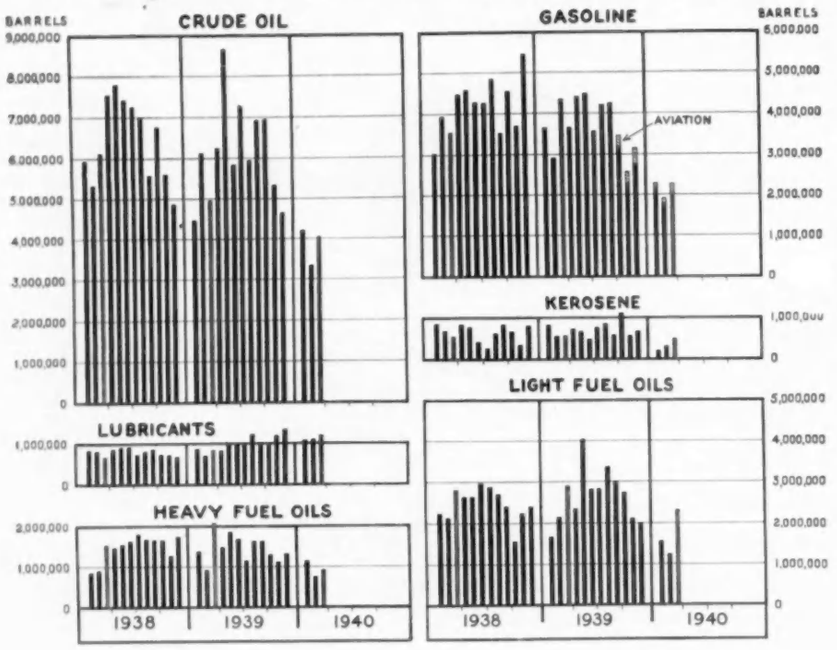
Oil Demand Up in 1940 Despite Smaller Exports

Figures indicate barrels, and are from Bureau of Mines

	MARCH			FIRST THREE MONTHS		
	1939	1940	Percent Change	1939	1940	Percent Change
SUMMARY—						
Total Demand	116,747,000	121,997,000	+ 4.4	330,140,000	355,821,000	+ 7.8
Daily average	3,766,000	3,935,000	+ 4.4	3,668,000	3,910,000	+ 6.6
Exports:						
Crude petroleum	4,966,000	4,046,000	— 18.5	14,253,000	11,575,000	— 18.8
Refined products	10,849,000	7,583,000	— 30.1	26,678,000	20,074,000	— 24.8
Total exports	15,815,000	11,629,000	— 36.5	40,931,000	31,649,000	— 22.7
Domestic Demand:						
Total domestic demand	100,932,000	110,368,000	+ 9.3	289,209,000	324,172,000	+ 12.1
Daily average	3,256,000	3,560,000	+ 9.3	3,213,000	3,562,000	+ 10.8
TOTAL DEMAND FOR PRODUCTS						
Motor Fuel:						
Domestic	42,520,000	44,607,000	+ 4.9	114,882,000	122,534,000	+ 7.7
Exports	4,336,000	2,265,000	— 47.8	10,883,000	6,442,000	— 40.8
Total	46,856,000	46,872,000	+ 0.03	125,765,000	128,976,000	+ 2.6
Aviation Gasoline (included above):						
Domestic	*	427,000	.....	*	1,337,000	.....
Exports	392,000	249,000	— 36.5	1,127,000	529,000	— 53.1
Total	.....	676,000	.....	.....	1,866,000	.....
Kerosene:						
Domestic	5,201,000	6,273,000	+ 20.6	17,082,000	20,178,000	+ 18.1
Exports	546,000	485,000	— 11.2	1,888,000	1,174,000	— 37.8
Total	5,747,000	6,758,000	+ 17.6	18,970,000	21,352,000	+ 12.6
Gas Oils & Distillate Fuels:						
Domestic	13,923,000	16,494,000	+ 18.5	45,653,000	57,211,000	+ 25.9
Exports	2,924,000	2,318,000	— 20.7	6,730,000	5,101,000	— 24.2
Total	16,847,000	18,812,000	+ 11.7	52,383,000	62,312,000	+ 18.9
Residual Fuel Oils:						
Domestic	28,436,000	30,881,000	+ 8.6	82,468,000	89,845,000	+ 8.9
Exports	2,047,000	932,000	— 54.5	4,351,000	2,840,000	— 34.7
Total	30,483,000	31,813,000	+ 4.4	86,819,000	92,685,000	+ 6.8
Lubricants:						
Domestic	1,987,000	1,883,000	— 5.2	5,249,000	5,459,000	+ 4.0
Exports	829,000	1,193,000	+ 43.9	2,360,000	3,350,000	+ 41.9
Total	2,816,000	3,076,000	+ 9.2	7,609,000	8,809,000	+ 15.8
Wax (thousands of pounds):						
Domestic	20,495,000	19,343,000	— 5.6	68,303,000	71,558,000	+ 4.8
Exports	26,384,000	25,642,000	— 2.8	63,887,000	75,051,000	+ 17.5
Total	46,879,000	44,985,000	— 4.0	132,190,000	146,609,000	+ 10.9
Coke (short tons):						
Domestic	129,200,000	119,900,000	— 7.2	356,300,000	383,400,000	+ 7.6
Exports	9,800,000	13,700,000	+ 39.8	28,400,000	35,800,000	+ 26.1
Total	139,000,000	133,600,000	— 3.9	384,700,000	419,200,000	+ 8.9
Asphalt (short tons):						
Domestic	230,700,000	254,200,000	+ 10.2	575,100,000	547,000,000	— 4.9
Exports	2,700,000	18,900,000	+ 600.0	13,500,000	62,300,000	+ 36.1
Total	233,400,000	273,100,000	+ 17.0	588,600,000	609,300,000	+ 3.5
Road Oil:						
Domestic	228,000	111,000	— 151.3	581,000	311,000	— 46.5
Miscellaneous:						
Domestic	187,000	123,000	— 34.2	513,000	398,000	— 22.4
Exports	9,000	126,000	+1300.0	22,000	377,000	+1613.6
Total	196,000	249,000	+ 27.0	535,000	775,000	+ 44.9

* Figures not available.

U. S. Exports of Crude Petroleum and Refined Products



products into better relationship to the market requirements for those products.

Weekly statistics for more recent periods also have evidenced effectiveness of efforts toward bringing about a better over-all inventory situation for the industry. Gasoline stocks gradually are being reduced, although more slowly than desirable; and fair results are being obtained in building up stocks of light fuel oils. In February, 1940, stocks of those oils were reduced 16 percent below the level of February, 1939. But now the supplies are about 6 percent larger than a year ago, having broken above the 1939 trend a few weeks ago. Petroleum economists have advised, however, an extension of special efforts toward building up the stocks of the light fuel oils this summer more than normally; having suggested as economically desirable an inventory of about 48,000,000 barrels on September 30, an increase of about 25 percent over the 38,000,000 barrels held on September 30, 1939.

Market Conditions

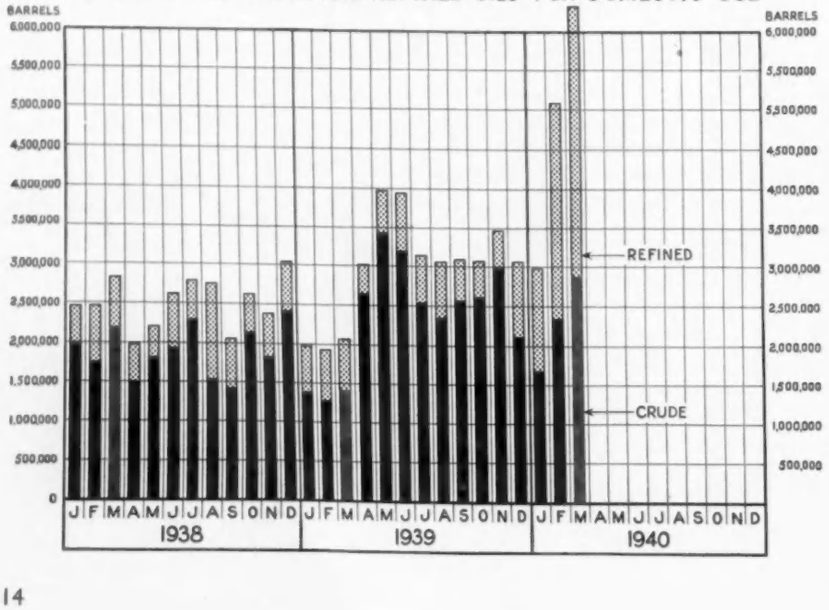
Weakness of the industry's market situation has been attested in the past few weeks by marking down of prices of both crude and refined oils. The gasoline market has become further unsettled, and wholesale and retail prices have been lowered in nearly all sections of the United States. Consequently, present prices are even lower than the depressed prices of a year ago. Retail prices of gasoline were reduced drastically throughout the Pacific Coast region May 28, and there have been reductions of service station postings also in the Southwest and other districts lately, while wholesale markets have continued unsteady, with prices extremely low.

The weak gasoline market on the Pacific Coast caused general adoption recently of the lower crude prices initiated in California February 1 by two major purchasers, although the original reductions were based on depressed prices of fuel oils on the West Coast.

Still around 100,000,000 barrels, gasoline stocks in the United States as a whole apparently embody a

[*Continued on page 44*]

U.S. IMPORTS OF CRUDE AND REFINED OILS FOR DOMESTIC USE



Changes From Year Ago in Stocks of Crude and Refined Oils in the United States

(Figures indicate barrels)

LATEST WEEKLY DATA

(Sources: Crude Stocks, Bureau of Mines; all other figures American Petroleum Institute)

STOCKS OF:	June 3 1939	June 1 1940	Percent Change
Gasoline	84,070,000	100,353,000	+19.4
Gas Oil & Distillate	27,949,000	29,533,000	+ 5.7
Residual Fuel Oil	111,282,000	104,768,000	— 5.9
Crude Oil	[1]278,289,000	[2]259,330,000	— 6.8

LATEST MONTHLY DATA

ITEM	Stocks at End of March 1939	1940	Percent Change
SUMMARY—			
Crude Petroleum:			
Refinable in U. S.	276,355,000	251,120,000	—19.1
Heavy in Calif.	15,814,000	13,485,000	—14.7
Natural Gasoline	4,721,000	5,393,000	+14.2
Refined Products	266,342,000	273,845,000	+ 2.8
Total, all oils	563,232,000	543,843,000	— 3.4
Days' supply:			
March basis	150,000	138,000	—18.0
PRODUCTS—			
Gasoline:			
Finished	81,189,000	96,467,000	+18.8
Unfinished	5,932,000	7,243,000	+22.1
Total	87,121,000	103,710,000	+19.0
Kerosene	5,605,000	4,114,000	—26.6
[3]Gas Oil & Distillate Fuels	20,115,000	18,541,000	— 7.8
[3]Residual Fuel Oils	89,768,000	84,115,000	— 6.3
Lubricants	7,800,000	8,084,000	+ 3.6
Wax (thousands of pounds)	117,537,000	90,373,000	—23.1
Coke (short tons)	694,000,000	624,000,000	—10.1
Asphalt (short tons)	650,000,000	699,000,000	+ 7.5
Road Oil	907,000	924,000	+ 1.9
Miscellaneous	235,000	368,000	+56.6
Other Unfinished Oils	38,216,000	36,920,000	— 3.4

[1] Stocks, May 27, 1939.
[2] Stocks, May 25, 1940.
[3] At refineries only.

Stabilization Through Proper Well Spacing

By DON R. KNOWLTON
Production Manager, Phillips Petroleum Company

BLANK & STOLLER CORP

D. R. KNOWLTON

Ably discussed means of stabilizing the oil production branch of the industry before the Illinois-Indiana Petroleum Association meeting at Robinson, Illinois, on June 1, 1940. His remarks are reproduced in the accompanying article, in which he asserts the reduction of developing and operating costs offers the best possibilities for improving the producer's plight. The most simple approach to this problem, Knowlton continues, lies in development of reserves with less capital expenditure, which may be accomplished by wider spacing of wells and unit operation of pools.

THE ultimate aim of all business endeavor is to gain profits. In each business transaction there is some measure of risk. Generally speaking, it is true that in businesses which experience a quick return on invested capital, the risk is always great. In the not too distant past the oil industry was probably the outstanding example of the business of long chances and immense profits. That is not entirely true today. Though chances are still long, the profits are not immense.

As a result of the operation of the simple laws of economics, these high profits attracted more capital and more endeavor until today oil reserves and potential current production have risen to the extent that the chance for quick profits and overnight riches in the oil business have practically disappeared. The oil industry now is like any other business which requires eternally careful operation if we are to end the year with profit. The "Oil Game" has become the "Oil Business."

I believe that the oil man has a more difficult problem than a man in any other business. In addition to the general problems of taxation, high labor costs, and bureaucratic control, the oil man is bound to respect complicated and often indeterminable property rights; likewise he is bound to conserve natural resources. Not the least of the oil man's worries arises from the wide variance in the cost of the raw product.

In cotton, corn, or shoe leather there is no wide difference in the cost of producing the raw product, and the old economic law of supply and demand should probably prevail. In our business, however, we find oil which costs 90 cents a barrel to pump competing for a market with oil which is flowed to the tanks at a cost of 2½ cents per barrel. I think that we can be justifiably proud of the manner in which we have met this problem and saved from abandonment literally billions of barrels of crude oil.

All oil men, especially those engaged in the business of producing oil, row the same boat. The price of oil, the market demand for oil, and the threat of federal control are the common problems of all. Acting individually, the oil producer could exercise only limited control of his business and his chances for a profitable enterprise. For these reasons, it is not only desirable, but absolutely essential that such organizations as the Illinois-Indiana Petroleum Association function as a clearing house of ideas and as a means for the expression of the will of those who are engaged in the business.

Some of our problems are extremely complex. The legal aspects, in defining property rights, have defied satisfactory solution since Titusville. Problems of selection of pumping equipment and problems of pressure maintenance and reservoir control are full of complexities. In spite of all these, the ultimate problem of our business

can be simply stated—to make income exceed the cost.

What are these items of cost and income? The principal costs are three: leasehold, development, and operating.

We have but scant control over the price to be received for our product. Frequently we hear the belief expressed that a price increase would stabilize our business. But that is getting the effect before the cause and, to be trite, is wishful thinking. We can't base our business investments on what we wish to be true. We may as well make up our mind that our job is to make money at the present price of crude. The quantity of our current sales is established by regulatory proration in some states and purchaser or pipe line proration in others. The quantity of our ultimate sales is limited to the amount of recoverable oil in the reservoir.

Let us analyze the factors which go to make up the costs of an oil producing property. No lease can be evaluated properly until it is drilled. Leasehold costs are determined as much by nearness or remoteness from production as by any other factor. In the leasing of lands competition between producers is at its peak, and this is as it should be. Certainly there is no method available whereby the business can exercise other than slight control over leasehold costs.

Cures for Plight

The reduction of developing and operating costs offers the best possibilities for improving the producers' plight. These costs can be reduced and must be reduced if our business is to be stabilized in the near future. Fortunately, we as producers can, legally and in good faith, bring about a reduction in these costs through one simple principle and two simple means:

The one simple principle—to develop reserves with less capital expenditure; the means—wider spacing of wells and unit operation of pools.

Spacing of Wells

The opinion has been expressed both by economists and regulatory authorities as well as those actively engaged in the business that unnecessary wells are the chief source of the ills of the industry. Such has been the theme of reports of subcommittees both of the A.P.I. and the I.P.A.A. This matter of well spacing is a combined problem of economics and engineering. In its practical application the problem is more complicated than appears on the surface. Not the least of our difficulties arises from an inability to overcome habits. While it is true that the regular 330-foot 10-acre locations fit readily into the land survey systems used in most parts of the country, this is a shallow reason for continuing to follow this pattern, and seldom is it economically justified.

In any conflict of ideas where more than just a few people are concerned, extremes on both sides of the question will develop. This is true in the matter of well spacing. We hear arguments from advocates of extremely wide spacing to the effect that the low price of oil requires wide spacing if the oil industry is to continue to exist. This is not true. The oil business furnishes a product too valuable to society for it to cease to exist. If the claims of these advocates of wide spacing were qualified properly, they would hold that wide spacing must be resorted to if the independent operator or oil company with only limited financial means is to continue in the industry. If we continue to space our wells closely, the financial strain will mount and the independent oil man will be forced to abandon the business.

On the other hand, the advocates of close spacing contend that it is necessary to follow such spacing in order to get all the oil in the reservoir. This is entirely a matter of degree. If the fact that 10-acre spacing will recover more oil than 15-acre spacing means that 15-acre spacing should be condemned, then it would follow that the fact that 5-acre spacing would recover more oil than 10-acre spacing should condemn 10-acre spacing, and so on ad infinitum.

So we must look between two extremes to arrive at a proper governing rule by which well spacing must be determined. As a business, the governing factor is the amount of net profit possible, but, like all other businesses, the oil industry has an obligation to the public which it cannot disregard. This obligation is very clearly stated by M. G. Cheney, president of Anzac Oil Company, in his testimony before the Cole subcommittee when he said, "Since our total national reserves of oil from all sources is very large, our present interest in regulating oil production may be based more logically on the conservation of low cost oil readily producible than solely on our adequate supply for future generations. If we are to thus provide for the economic welfare of the future, it is reasonable that we should consider the economic welfare of the future, it is reasonable that we should consider the economic welfare of the present including the problem of economic spacing of oil wells."

I am sure you will agree with the logic of Cheney's statement.

So our problem in the solution of this well spacing matter is to space our wells so that each reservoir is sufficiently drilled to give an adequate supply of readily available low cost oil to the public, and at the same time developing these reservoirs with few enough wells to permit profit that the existence of the independent oil man remains out of jeopardy. The solution of this problem is affected by many factors, such as the market for the sale of the crude, the cost of drilling and equipping a well, the source of the energy by which the well produces, and the recoverable oil per acre in the reservoir. You can understand how it is economically unjustifiable to drill wells to a depth of 10,000 feet on a pattern the same as is justified at a depth of 3000 feet. This problem is incapable of mathematical solution. Even if it were possible to establish a formula for determining the best spacing program for a certain reservoir, at a certain time, this formula would have little utility, for the reason that in a month or so the value for the variables in the formula would probably be changed completely. All we are able to do toward the solution of this problem is to chart the trends of the price of oil and the shift in market demand of the supplies of crude in new areas and to more prolific wells in old areas in order that we may determine a general course to follow.

I have watched this trend for many years. It indicates today more than ever before that operators who want to continue in this industry must spread out their drilling pattern and develop their properties with fewer wells than used heretofore and substitute for the wells saved a more intelligent use of reservoir energy. In view of our present knowledge of reservoirs, it is unsound to drill more wells than are necessary to adequately drain the pool. The operator who stubbornly forces the unnecessary drilling gains only a tem-

porary advantage; and seldom if ever does he gain enough to regain his investment. But he drags his neighbor through the wringer by forcing him to drill to the same density. In the end, the operators all have substantially the same share of the pools' production as they had prior to drilling the added wells. The only telling and lasting effect is that capital investment has increased. It is much like a law suit or a war. No one wins and everybody loses. In East Texas there were upwards of 13,000 unnecessary wells drilled at a cost of over 130 millions of dollars. These wells do not make possible more production currently or ultimately. Indeed, there is reason to believe that water coning and fingering in the densely drilled areas may have trapped oil, so that actually there will be less oil recovered than if the development had been orderly. This 130 million dollar investment in unnecessary wells had to be amortized. This necessitated producing the field at too rapid a rate, forcing immense quantities of distress oil on the market, thus crippling the entire industry. Although there is probably no way to calculate it, the increased operating cost resulting from excess drilling would unquestionably be a staggering sum.

Wider Spacing Grows

Encouraging progress is being made in efforts to bring about a general trend toward proper and wider well spacing. Its feasibility was first demonstrated in New Mexico and in the great Yates field of West Texas.

As other fields in West Texas were discovered, operators saw the necessity for developing them on wider patterns and the experience gained there gave impetus to the general movement toward wide spacing.

In 1935, Oklahoma amended its conservation law to give the State Corporation Commission power to establish drilling units and to require the unitization of small tracts, if necessary, to make a full drilling unit. This law has since survived two court tests, one of which was carried to the Supreme Court of the United States. Missippi, New Mexico, Michigan and Arkansas all have splendid well-spacing statutes, and the operators in those states are thoroughly sold on them.

In the Magnolia pool of Arkansas, production is found at a depth of 8000 feet in a highly porous oolitic lime. The reservoir has an effective water drive. Upon its discovery the Conservation Commission of Arkansas established 40-acre spacing units for that field. As a result the 4000 acres in the field were developed with 100 wells. The daily allowable for the entire field is 20,000 barrels. Operators in this field have gratifying payouts and they will recover just as much oil with these 100 wells as could have been recovered had 400 wells been drilled to develop the pool to a density of 1 well to 10 acres. Because of the 40-acre pattern the pool was developed to the edge in a much shorter time than if 10-acre spacing had been used. Had it been necessary to develop this pool on 10-acre spacing, it would have been a much longer time before the edge of the pool was reached, and in the meantime edge properties would have been drained of the oil. It would have taken four times the investment to develop the pool. Since the market outlet is limited by pipe line capacities, the allowable per well would be 50 barrels, or at most 75 barrels per day. Payouts at this rate would be unsatisfactory. Operators would be in an insecure bargaining position in so far as the sale of oil is concerned and the price received would no doubt have been less than it now is. In spite of having invested four times the capital in the pool, the revenue could only be slightly, if at all, increased.

Although Kansas has no direct law as to spacing, there is a provision in the proration law which gives very effective indirect control over spacing to the State Corporation Commission. In providing for the method of distributing allowable, the Kansas law requires that the acreage attributable to the well be considered. In this respect the law is similar to those of New Mexico and Arkansas and to some of the better field rules in Texas, in that for proration purposes the emphasis is placed on acreage rather than on the well. This feature is the secret of success in eliminating unnecessary wells. The Kansas law was adopted in the middle of last year, and on September 1 the commission promulgated a rule giving full credit to acreage up to 20 acres in the allocation of allowable oil. Between that time and May 1 of this year, 72 percent of the wells drilled in Kansas have been on 20-acre spacing. At the time the commission was considering promulgation of rules under the new law, the opponents of wide spacing argued that such a rule would retard drilling of wells which they said was contrary to the best interest of the people. Experience has shown, however, that more wells are being drilled in Kansas today than were being drilled before the adoption of the rule. Wide spacing has increased drilling and has only eliminated the drilling of *unnecessary* wells. Though this sounds contradictory, it is entirely sound. We should not cease to drill wells or discontinue development of reserves. But these reserves must be developed with less cost. Today the Kansas oil situation is on a sound economic basis. Farmers who have heretofore had to be content with their annual rentals are now receiving royalties. Supply men, realizing that under this new set-up each well develops twice the reserve, are readily extending credit for equipping and producing the wells. The independent operators are developing their leases with half the capital investment as heretofore needed.

Even among the advocates of wide spacing all is not in harmony. The most controversial point concerns the pattern to be followed. Referring again to Kansas, we find most of the operators are content to drill in the center of 20-acre rectangles, 1320 feet long and 660 feet wide. The advantage of this is that it provides direct offsets between leases and conforms to the regular governmental surveys. It has the disadvantage, however, of being 1320 feet between wells in one direction and 660 feet between wells in the other direction. Some operators will develop their wells on 20-acre spacing by drilling every other 10-acre spot. This gives a uniform spacing pattern, but does not provide direct offsets.

Another difficulty which the advocates of wide spacing have met but which has been mainly overcome is hesitancy of operators to enter into well spacing agreements for fear that it might be in violation of some anti-trust law. This feeling prevailed generally in Texas at one time. Well spacing problems were worked out by mutual oral agreements only. This feeling has been overcome, however, and we no longer encounter any difficulty in reducing spacing agreements, otherwise satisfactory, to writing. The feeling prevails yet in Illinois, however, to a certain extent. Re-

cently we attempted to circulate a well spacing agreement covering an area which we proposed to develop. One large company stated that although they concurred in the spacing plan proposed and would follow it in developing their properties, they could not execute the agreement for the reason that their attorneys were of the opinion that a well spacing agreement might be construed to violate a provision in the Illinois law forbidding contracts for the purpose of limiting production. One of the independent operators who owned leases in the area agreed with the plan proposed but refused to follow it unless all parties affected signed the agreement. Thus we had a situation where a spacing agreement was impossible because one set of attorneys demanded a written agreement, and another set of attorneys would not permit its clients to sign a written agreement, although all parties would have preferred to have followed the pattern proposed and would have saved thousands of dollars by so doing.

Such a situation seems absurd, and I am convinced that there is no foundation for an interpretation which prevents well spacing agreements. It does, however, forcibly exemplify the necessity for an adequate and friendly oil control bill.

Texas, as you know, has given its State Railroad Commission wide powers in the matter of regulating production of oil. Although we have our differences, we must admit that the Texas Railroad Commission has a very difficult task. In most parts of Texas the land surveys are small and irregular, making it very difficult to work out spacing patterns which do equity to all operators and all leases. Being aware of the fact that too many unnecessary wells were being drilled, they have amended their spacing rule to require special permits unless the wells be located in the center of square 20-acre tracts, or unless special field rules for the pool have been adopted by the commission.

Where the opportunities of one to capture oil under the lands of another has been minimized by regulatory proration, with acreage a factor, the unnecessary wells are not drilled. This, of course, is the method which Kansas, Arkansas and New Mexico have used to eliminate their spacing worries. I imagine that some of you have the feeling that you would prefer to get along without the aid of regulatory authorities. I am not here to beat the drum for a proration law in Illinois, although it is my personal conviction that one is needed. My only hope that the Illinois legislature will determine the will of the majority as best they can, and act accordingly. I will say that a good conscientious regulatory body can be a tremendous help to the industry, whether it be in Illinois, Indiana, Oklahoma, or any other state. I am anxious to excite at least a spark of curiosity concerning this matter of spacing, and hope you will consider it seriously as an economic problem vital to all producers.

I am not pessimistic about the future of our business. Neither can I be optimistic. I hope and believe that the industry in general is becoming more and more cognizant of the situation which they must ultimately meet and solve — this problem of limiting our capital investment per unit of current income and per unit of ultimate income.

Unit Operation

I would like to make a few remarks about the one other phase of business in which there is additional net income available through reduction of operating cost and additional ultimate income through the recovery of a greater quantity of oil.

Unitization was first proposed in 1893 by Henry L. Doherty, so you see, it is far from being a new idea. Doherty was somewhat of a crank on this subject, and his idea was that laws should be passed to compel unitization of all oil fields. It is my belief that it was this idea of compulsory unitization which earned for the plan its enemies. At any rate, it was not until 1930 that the A.P.I. approved it. Today it is well accepted by the large majority of the industry, although there are still a few who will not consider it. Many unitization projects have established overwhelming proof of the superiority of this method of operation.

A current example of the results possible under unitization is found in the Billings Wilcox pool in Oklahoma, discovered in August of 1935. After development was substantially complete, the four operators owning all but a few extreme edge leases formed a unit to operate the pool. This made it possible to unitize careful reservoir control and to take advantage of a pronounced and efficient water drive. The sand has zones of varying permeability, and in order to prevent uneven water encroachment, and in order to extend the flowing life of the wells, the rate of withdrawal was voluntarily reduced and pressure maintenance was instituted. Over 4½ million barrels of crude have been produced in the past two years and the bottom-hole pressure has decreased but four pounds. The lifting cost has been only 3.1 cents per barrel.

At South Burbank, in Oklahoma Osage country, at Van and other fields in Texas, at Tepatate in Louisiana, and Lance Creek in Wyoming, splendid achievements are being made through unit operations.

Secondary recovery projects in Eastern Kansas, possible only through unitization, have given gratifying results.

Unitization and some of the operating practices which it makes possible merit careful consideration by the members of this group. In connection with this subject I would like to call your attention to the statement by Frank Phillips in an article which he wrote for The Mines Magazine, which is a publication of the Colorado School of Mines.[1] After pointing out some of the advantages to be gained through unitization, he made the following prediction as to its future, "In my opinion, unitized pools eventually will determine the price level for crude oil. Their greater economy will begin to reflect itself in the industry's over-all picture as advocates of unitization create a sufficient number of units to affect an appreciable proportion of their daily production. The operator who refuses to investigate, advocate and participate in unit projects and their affiliated progressive methods is going to find himself gradually falling behind the parade." Time will prove this assertion to be correct. The refusal of some operators to participate in unit projects has been used by the proponents of the Cole bill to make powerful medicine. I strongly recommend not only your favorable consideration but your active support in furthering the trend of this plan.

No problem is the source of all our ills in this industry. Taxes threaten our very existence. Low prices for our products cast a shadow on our investments. Just which is our most pressing problem is difficult to say but we may be sure that the problem of unnecessary wells ranks near the top. These problems will be solved either by the laws of economics and the Cole bill, or they will be solved by careful intelligent planning of the industry itself. It is up to us.

[1] Also published in THE OIL WEEKLY of August 14, 1939.

To the great majority, the aerial picture is interesting to glance at but of little practical significance; few realize that every rise or depression of the earth's surface may be measured accurately from these pictures. Use of precision instruments bring out detail equal to the sight of normal eyes elevated to the height of the camera and spaced in proportion to distance.

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Photogrammetry and the Oil Engineer

By HERBERT THAYER BRUCE

MAPPING is one of the oldest of sciences. Ancient maps were mere strips of paper on which dots were placed, the irregular spacing of the dots representing the number of days it took to arrive at that particular location. The traveler in those days followed a trail of camel dung or the ruts made by carts and eventually arrived at where he hoped to get, provided he was not murdered before he got there. The first use of meridians and parallels in an attempt to locate places scientifically is said to have occurred just prior to the Christian era, but the world had to wait for the discovery of instruments for surveying and the compilation of geographical data for anything resembling the maps we have today. Scientific cartography came along in the twelfth century and today we have the aerial survey resulting from the application of photogrammetry. Today, the engineer sits in his office and, by means of precision plotting instruments, maps any desired strip of territory in which his problem may be located whether it be in the depths of the Guiana jungles or in the heights of the Sierra Nevadas; and he plots to within an accuracy of one quarter degree. Just as the ancients lacked their verniers, lenses and cross hairs so did we moderns, until but recently, lack the precision instruments which have made photogrammetry possible.

When the aerial survey was first becoming recognized as a practicable and scientific industrial tool, it was often referred to as the fourth great step in mapping engineering advancement. The first great step was said to be the adoption of the unit of measurement, the refinement of mathematics as the second, the development of lens with its resultant precision instruments as the third, and fourth the coupling of the airplane and the aerial camera. That fourth step now is known as photogrammetry, although it had not then been applied generally as a recognized method of survey.

Photogrammetry is, of course, photo-measuring. The simplest de-

scription of its principles is in connection with the photo-measuring of an ordinary packing box. Its size is, for example, 90 inches by 60 by 30. But instead of measuring it with a ruler we photograph it to scale with a precision camera, the scale being, for the purposes of this description, one tenth. We thus learn that it measures, photographically, 9 inches by 6 by 3. Then we multiply these figures by 10 to arrive at the true dimensions. A "control" must be established by means of which depth may be determined by means of calculation; too, the box would have to be photographed in a series of overlapping prints which could be viewed and plotted stereoscopically. It is by stereoscopically plotting any two separate overlapping prints having a common ground area that the earth's surface is measured photogrammetrically.

Photogrammetry is a science known to engineers only since the coupling of the airplane and the aerial camera. It is only within the recent past few years, however, that it has been proved accurate beyond doubt. To the great majority, the aerial picture is interesting to glance at but of little practical significance; few realize that every rise or depression on the earth's surface may be measured accurately from these pictures. Those of us who have flown over rugged areas must have been impressed by the fact that the earth as we saw it from the plane's window was surprisingly lacking in three dimensional quality. That illusion arises from the fact that our two eyes from a height of 15,000 feet cannot gain the same perspective they would gain from viewing a relief map held a foot from the face. To obtain the three-dimensional quality from that height we would have to be a giant 15,000 feet tall looking down on the earth with eyes a mile apart. Our eyes are stereoscopic; one eye sees one picture and the other eye another picture, the two pictures overlapping to give the illusion of depth. It is the same with two overlapping aerial photographs, exposed in sequence and having a common ground area, when viewed through the stereoscope. Exactly the same ground view is obtained as that seen by the 15,000-foot-tall giant with eyes a mile apart. This fact is accounted for by definite geometric principles. Our eyes follow exactly the same angular paths two transits would follow were they placed in the position at which each picture was exposed. As the transits would converge at a high point or diverge at a lower or more distant point so do our eyes converge or diverge, the amount of this convergence or divergence being an exact mathematical quantity.

Obviously, precision instruments are necessary to perform this work with the desired degree of accuracy. The aerial survey is by no means a simple matter of taking any old ship into the air and snapping a series of pictures haphazardly with any old camera. As one expert has worded it, "The photogrammetrist demands of his plane that it be a thing of beauty, streamlined to the limit of its strength, and having got this, he reaches for a hack saw, cold chisel and axe to cut openings through which to aim his camera at some new or odd angle he has just thought up." The aerial survey ship will be found to be the last word in airplane design. Cameras are a dime a dozen in any 'round-the-corner store; but not the aerial camera.

There is the wide-angle precision camera especially designed to produce photographs for extremely accurate mapping work to conform to the rigid specifications laid down by different departments of the United States government and also by the American Society of Photogrammetry. It holds a roll film in any length up to 450 feet for approximately 600 exposures. The focal plane is a vacuum back employing a venturi tube as the source of vacuum. Another recent camera development is an 18-inch by 18-inch affair especially designed for land surveys. Its lens of 12 inches in focal length permits accurate exposing to large areas in large scale. By means of this camera, a survey job requires one quarter the number of pictures, one half the amount of flying time and one quarter the amount of ground control commonly needed with other available instruments. This camera is loaded with a 410-pound roll of film containing 600 exposures; the film contains enough high explosive to make it effective as a bomb. There is a complete range of cameras for survey work from the small hand camera for oblique photographs to the largest camera in the world, a nine-lens affair designed for the United States Coast & Goedetic Survey which in a single photograph taken at a scale of 1:20,000 will cover approximately 120 square miles.

These cameras are "made to order" for the oil industry, particularly in connection with exploration work. When Shell Oil Company surveyed in the Peten Jungles of Guatemala, it required a map having great fidelity of detail and considerable accuracy as regards planimetry in order to carry out geological studies.

In such little known sections of the world as the Peten Jungles, pilots have considerable difficulty in following guide flight lines in order to make accurate overlapping exposures. Invention of the solar-navigator made possible the flying of a plane down an accurate course over a distant unknown and unmapped territories. Our flying experienced readers can well appreciate the difficulty encountered in trying to pilot a ship along flight strips each from 60 to 100 miles in length, and to pilot them sufficiently parallel to each other so that no gaps are left between; efficient overlap is dependent on accurate strip flight. He can imagine, too, the problem of flying 4 miles high over a territory about which little or nothing is known and trying to keep the plane going down an imaginary line the while constantly changing its heading to compensate for variations in wind direction and velocity. Until the arrival of the solar-navigator, those pilots who could do it did it largely by instinct.

The solar-navigator consists of a drift indicator in the floor of the plane, stabilized by a gyroscope, and a sun compass in the ceiling of the plane from which the drift indicator is suspended; the sun compass registers by remote control on a galvanometer on the pilot's control board and the desired course is set between the direction of the drift lines on the drift indicator and the axis of the sun compass. This instrument will fly a plane down any predetermined course to within an accuracy of one quarter degree. With its assistance, a photographic plane may take off over any known astronomical or Coast Survey station and from any two such points carry triangulation far into the interior of a country, taking a series of photographs at all points where each triangulation flight line intersects every other line. For many years, engineers considered aerial mosaic maps of little known sections of the earth rough and inaccurate; now, such mosaics assem-

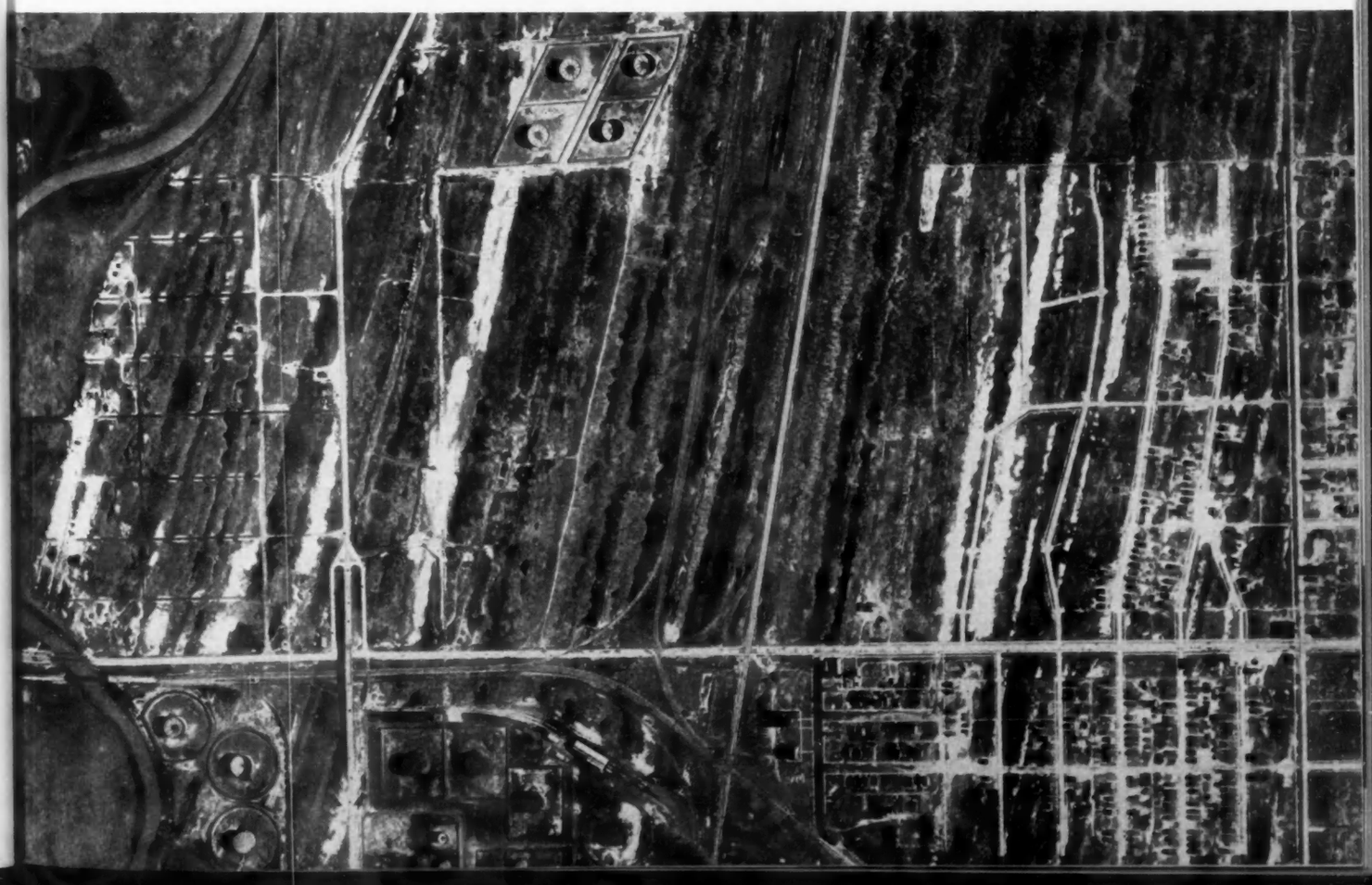
bled by a slotted template method assure surprising accuracy.

So much has been written in recent years about the taking of aerial pictures and mosaic map assembly that the average oil engineer in fully cognizant of their details. Indeed, those details are of little practicable importance to him; his interest is in their application. Accurate contouring is the result of the development of precise steroscopic plotting instruments, such as the stereoplanigram, the aero-cartograph, and the Multiplex, a Zeiss product of which there are over a hundred in use in the United States. Then there is the stereocomparagraph; an instrument for compiling vertical data such as form lines, profiles, slopes, etc., as well as planimetric details directly from overlapping vertical aerial pictures. These instruments work on the principle of replacing the two aerial pictures in miniature as they were at exposure; thus the exact angle and elevation of each picture is reproduced at the small scale of the stereoscopic model. An index or reference mark is provided which is so mechanically articulated that it can appear to move only in a single horizontal plane. This index mark appears to float in the air if it is over a canyon and to bury itself in the plastic ground if deeper than the ground surfaces. Thus, by the operation of two hand wheels, the operator causes the index mark to trace off exactly the surface of the plastic image; while actually following a contour line, the machine draws on a piece of paper, thereby forming a map. By this means, maps may be made to any degree of precision; scales may be as large as 1 inch to 20 feet to as small as one inch to 2 miles. A skeleton of ground control points is essential for proper preparation; an area to be mapped at a scale of 1 inch to 1000 feet would require a known control point for each square mile of territory.

Pipe Line Work

Pipe line construction was one of the earliest applications of the aerial survey. And a most practical one. If ever an engineer had to know ahead of time exactly where he had to route himself and the exact conditions of the terrain, as well as ownership, it is in connection with the laying of a pipe line. property owners have a habit of finding that they need most desparately a particular section of property just as the engineer decides that he needs it for a right-of-way. By means of the aerial survey, however, the survey being made weeks or months ahead of the commencing of the actual work, and thereby still an office secret, no property owner should have even an inkling of what is proposed and a has-been turnip patch remains a has-been turnip patch. Too, the aerial survey eliminates uncertainty and guesswork. An engineer knows what ground lies beyond a ridge because he has seen that strip of land in the aerial picture. Its use greatly eliminates "back-tracking" of the survey crew which gets off on a wrong tangent, thus stepping on the toes of the construction gang following closely behind. This because the ground survey is not infallible. Unforeseen kinks in the line run into additional mileage which adds to costs, particularly when boards of directors vote on the building of a line without previous warning and appropriate an insufficient budget because ground conditions are not known.

The pipe-line engineer armed with the aerial survey map is like the soldier armed with the new Garland rifle. One glance at the aerial map gives him the coverage of shotgun fire. The contour map will give the field engineer the height of every rise and the depth of every gully; the photographic



One of the early applications of the aerial photograph in the oil industry was for pipe line location. The view below is one made for that purpose.

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strip map or separate mosaic prints will show him the ground conditions of every acre to be passed through; the office engineer with a mosaic map of the proposed route hanging in his office can string his line from point to point and watch its progress with factual knowledge of the problems with which his field men are contending.

The controlled strip mosaic is an essential part of every pipe-line job, and the control should be made by a reliable method such as the slotted template method; by using this control method, it is possible to keep the prints properly oriented, thus avoiding the errors which crop up when rights-of-way traverse rugged territory.

The pipe-line engineer is, of course, concerned with two major factors; mileage and cost. It has been said by an engineering authority that while actual savings in the length of a line cannot be predetermined by the aerial survey, it is conservatively estimated that about half a mile to every 25 or 30 miles is saved in flat country. The fact is that in flat country, orchards, schools, cemeteries and the like cause more angles than cliffs and gullies in rough country. And such obstacles are clearly shown in the aerial map before the engineer even approaches the location of an obstruction. Relative to costs, the avoidance of buildings and impossible topographical features in 100 miles of line results in a saving which, it is said, has been conservatively estimated at twice the cost of the survey itself. Also, pipeline companies have found that the reduction of a fraction of 1 percent of a contractor's bid will offset the cost of the aerial survey. An oil engineer has reported that the actual staking out of the line for construction can be done by field parties in half the time by using aerial maps.

The aerial map is also applicable to recording the details of conconstruction in the producing fields. It supplements the "utility" map by giving 100 percent detail, thereby answering many engineering questions without the necessity for leaving the office for a look-see. Also, they are valuable for use in presenting problems to boards of directors and technical problems to juries when law suits have blocked construction progress. But the most valuable use is in connection with geological studies.

In our country, much of the geological aerial survey work has been done in California and Texas; foreign surveys, however, have covered practically every producing and potentially producing country from Canada down through the Central Americas to the Latin countries of the southern hemisphere. In territories of bold relief where surface topography reflects sub-surface conditions, the aerial photograph has proved its utility. The San Joaquin Valley is a section where thousands of square miles have been recorded aerially and have given valuable additional information to the geological facts supplied by ground studies. This is likewise true in the Ventura district where bold relief faults, contacts and bedding show on the aerial pictures with surprising clarity. Jungle countries are equally penetrable; rock outcroppings become apparent because of the scarcity of vegetation. Similarly, conditions of the vegetation reflects oil seepages. Drainage is easily followed on the aerial picture, thus indicating anticlines or folds.

What the geologist wants to discover through the aerial picture are anticlines and geological highs. These the aerial map will show in numerous ways. For example radial drainage usually indicates the location of a high. When a country is of bold relief, an anticline may show distinctly as a closed structure or it may be indicated by the dipping beds, which are interpreted by stereoscopic study. An anticline may be further suggested by the arching of a stream which makes its way through the structure following the bedding planes. The plan form of the eroded beds may reveal the anticline in a flatter region.

The aerial map will invariably pick up contacts which are not apparant on the ground. An example is the fact that it is unusual to be able to follow a contact through a field of standing grain. There again is the matter of vegetation; the two different types of soil on opposite sides of the contact nourish a different density of vegetation. This difference is shown by a change of tone or color in the pictures. Faults may be similarly picked up. Particularly since a fault line may be a contact line. The alignment of topographical features at variance with the general drainage features will also show a fault. The escarpment is often obvious, particularly when the pictures are taken at a time of day when the topography is accentuated by shadows. Stream displacement is usually one of the surest guides to a probable fault, and often the fault may be picked up by slight color variations due to the fact that the gouge affects the character of vegetation or that the gouge is actually of a different color than the soil on either side of the fault line.

Aerial maps have become a fairly standard geological tool. Aside from the wealth of information the geologist gets from his pictures, much of which he would not get without them, the aerial pictures also serve for the recording of his observations. The aerial map need not be supplemented by triangulation or nets of control. The geologist can discard his Brunton compass; an observation is plotted on his photograph at a stream intersection or rock outcropping which he can identify later. This after he has pieced together, bit by bit, the information of the picture with his experience on the ground. The geologist must rummage through the complete gamut of surface conditions ranging from arid and exposed desert to dense jungles and rugged mountains to gain the evidence from which he must make his interpretation . . . and then his interpretations will vary with bewildering profusion. The quality of the photographs his survey will give him may range from perfect pictures in the desert to useless smudges in the steaming jungles. But one thing he is certain of, however; the airplane and its camera have become a reconnaissance tool awaiting only his ingenuity in correlating its picture story with ground facts to simplify his explorative problems.

But little more than a decade ago, a general knowledge of aerial photographic survey methods and results together with but a nodding acquaintance with geology and engineering problems qualified one to cut loose on the subject as it applied to the petroleum industry. Today no such fact is true; the aerial map is a common tool in the hands of the oil engineer. Therefore, we can but give facts which others have proved. Yet, what the aerial survey can offer the petroleum industry today is immeasurably ahead of what it had to offer only yesterday. The aerial photographic survey is now a complex and highly specialized art; it is also a splendid modern way of taking a short cut to results. Of all industries, the oil industry is most suited to its many and varied applications.

Remote-Control Seismic Instruments

By P. M. HONNELL

SEISMIC exploration of many Gulf Coast areas is seriously hampered—when not rendered totally impossible—by transportation difficulties, particularly where water is to shallow for boats or marshes have too much brush for marsh buggies. The equipment required for seismic prospecting can then be transported only by man-power. Since this is generally a costly and inconvenient procedure, any profiles obtained in such areas are necessarily of limited extent.

Remote-control seismic instruments are designed to make feasible the exploration of such otherwise inaccessible regions. This is accomplished by keeping all the heavier recording equipment at a fixed location. The shot-point and seismometers are moved progressively along the desired profile with transmission lines connecting the seismometers to the recording oscillograph at the stationary position. The transmission lines are constructed of inexpensive wire, supported on stakes or shrubbery. This wire can be retrieved and used again or abandoned, depending upon the terrain or economic factors. Line construction usually continues in advance of the actual shooting, thus speeding up operations.

Since transmission lines have some attenuation, amplification is required at the far-end of the lines; furthermore, this results in a better signal-to-interference ratio. Small lightweight amplifiers are therefore used at each seismometer-group plant. Experience has demonstrated that they have sufficient gain for operation over transmission lines up to five miles in length without the necessity of further amplification at the recording oscillograph. Thus only the one remote line amplifier is required for each recording channel and no other amplifiers are required at the oscillograph.

Convenience of operation dictates that these line amplifiers be remotely controlled. The detonation of the dynamite charge should also be controlled from the recording position. This is remote control in the broadest sense, and is one of the outstanding features of this equipment.

Transmission Line

A schematic view of the entire set-up is given in Figure 1. This shows the recording equipment in a semi-permanent location connected by transmission lines to the line amplifiers and seismometers. The transmission lines extend beyond the seismometer plants along the desired profile. In shooting the profile, it is necessary only to move the remote amplifier and seismometers. The heavy recording equipment comprising the oscillograph, timing forks, batteries, developing materials, etc., remains at a fixed location; if possible, this is on an artery of communication.

It is possible to utilize a single-wire line with ground return between remote amplifiers and the location of the recording apparatus. However, the slightly lower wire costs of the line with ground return amounts to but a fraction of the total line costs considering labor, and is more than offset by the improved performance of two-wire metallic circuits. In particular, the cross-recording[1] between the oscillographic traces due to the mutual impedance of the common ground is eliminated.

Large ground currents are found to be present in some localities. Some of these currents are due to stray fields from commercial power systems; some are due to electrolytic effects at ground terminals. At times of bad static or during local thunderstorms, transient earth currents of considerable magnitude are found to exist; these are possibly due to lightning discharges to ground. Since these ground currents all have variable amplitudes, they have components in the recording frequency band,

[1] Cross-recording: response on oscillograph trace of a given channel due to a strong signal on an adjacent channel.

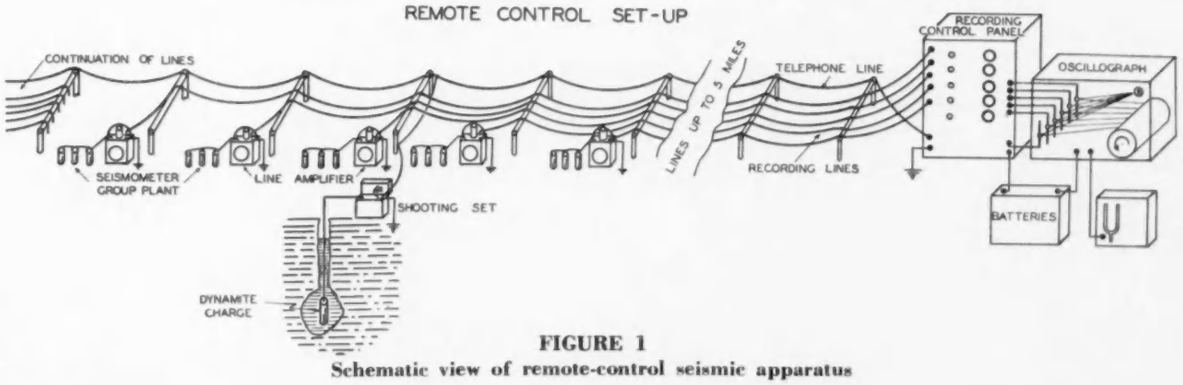

FIGURE 1
Schematic view of remote-control seismic apparatus

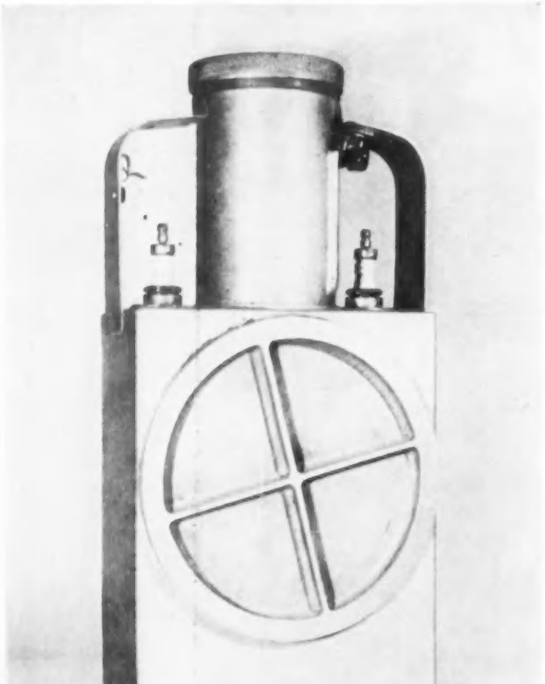

FIGURE 2
Remote line amplifier case

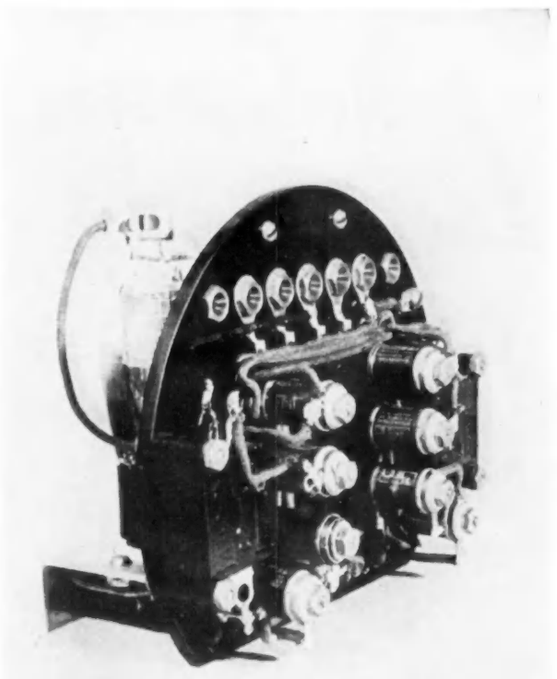

FIGURE 3
Amplifier plug-in assembly

and become evident as highly objectionable noise on the record when single-wire and ground-return lines are utilized. With a two-wire transmission system, these earth currents present no problem as they are balanced out. This in itself justifies two-wire operation. Finally, the use of two-wire lines makes practicable the remote control of line amplifiers.

The transmission line is constructed of number 20 or 24 twisted-pair wire, double cotton-covered and enameled. This insulation can be augmented by a water-proofing compound, when especially desirable. Such lines are found to have sufficiently low leakage between wires to render their operation successful for a considerable period, particularly when care is taken to place the lines on dry brush or small stakes so as to clear the surface of the ground. The separate lines for individual traces can be placed close together, due to the fact that there is practically no coupling between lines and no resulting cross-recording.

A rugged type of construction is required for the remote amplifiers, which are self contained and mounted in water-proof cases, as shown in Figure 2. The upper compartment contains the "A" battery for the vacuum-tube heaters, and is easily accessible for replacement. The "B" battery is contained in the main compartment, together with the amplifier proper, relay, etc. The amplifier assembly, shown in Figure 3, plugs into the case and is locked in place. This method of construction greatly facilitates servicing the amplifier, especially in the field, since the whole amplifier can be inspected conveniently when removed from its case.

It is not feasible to incorporate in a portable amplifier all the refinements of a recording-station type amplifier, for the resulting large physical size and attendant complications would defeat the purpose of portable amplifiers. Such a refinement is full automatic amplitude control of the recorded signal. A 25 db range of automatic amplitude control is, however, incorporated in these line amplifiers, primarily as a means of limiting peaks. This compares favorably with the 40 to 60 db amplitude range which can be controlled successfully in more bulky installations.

The portable line amplifiers comprise two pentode stages resistance-capacitance coupled to a triode output stage. Two type 6P7G tubes were chosen for these amplifiers, as they combine in single envelope both a high-gain pentode and a triode. The total heater current drain is 0.6 ampere, approximately the same as required by large flashlights. A "little six" flashlight battery is therefore a satisfactory type of heater supply and will provide five hours continuous operation; with normal intermittent operations, much longer battery life can be realized. The "B" battery life is, of course, normal.

The wiring diagram of the recording circuits is shown in Figure 4. The multiple seismometers are connected in series to provide a maximum in-phase voltage to the grid of the first high-gain stage. This is the pentode section of the

first tube; its triode section is utilized as the diode rectifier furnishing the amplitude control biasing voltage. The pentode section of the second tube comprises the remaining high-gain stage followed by the triode output tube.

The automatic amplitude control is provided by the diode connection which rectifies the output of the second pentode and limits peak amplitudes by furnishing a control bias on the same tube. The seismometer coils and the amplifier circuits proper are insulated from ground to prevent pick-up of electromotive forces from the stray ground currents directly into the amplifying circuits.

The output stage is coupled to the transmission line through a 16,000:50 ohm ratio transformer T_1; the line side of this transformer is center-tapped and connected to the relay winding L_1. The other side of the relay winding is connected to the shielding of the seismometer cable which interconnects the seismometer and amplifier cases which, being in contact with the earth, provides a low-resistance ground connection in most locations. If necessary, this can be supplemented by a ground rod. The relay can therefore be energized from the observer's position through the line and ground circuits without affecting the operation of the recording circuits in the same manner that telephone lines are simplexed for telegraph operation.

The contacts of the relay L_1 are connected in series with the "A" battery and vacuum-tube heater circuits. This provides the remote control of the amplifier.

Control Panel

The transmission lines from the remote amplifiers terminate on the recording control panel. The rapid diagnosis of line conditions is facilitated by the ohmmeter and associated switching arrangements, as evident from Figure 4. Throwing switch S_2 connects the line to the ohmmeter; this gives the metallic circuit resistance of the line and provides a check on the continuity of the circuit. Depressing either ohmmeter push-button S_1 gives the corresponding line-to-ground resistance. This is a test for leakage to ground, such as may be caused by moisture on the line.

When line conditions are satisfactory, the switch S_2 is thrown to the opposite contacts, thereby connecting the respective transmission line to the transformer T_2. The primary of this transformer is also center-tapped; this connection leads to the switch S_4. The purpose of this switch is to permit the line to be used for telephonic communication during construction periods and to operate the line amplifier. The other contacts on the switch S_4 connect to the 22½-volt relay battery supply which activates the amplifier relays. In addition, a separate contact operates a pilot light to indicate to the operator that the particular amplifier is turned "on." Thus the conservation of battery power is brought constantly before the observer's attention.

The secondary side of the transformer T_2 is connected through the switch S_3 to the 50 ohm constant-impedance attenuator A_1 to the oscillograph recording vibrator. The attenuator has a range of 45 db and provides the means for balancing the amplifier gain. Together with the automatic amplitude control within the line amplifiers, these attenuators provide ample latitude of adjustment for all usual conditions.

The function of the switch S_3 is to reverse the line polarity. The reason for incorporating this in the circuit is as follows: Under field conditions, the polarity of the twisted-pair line is difficult to maintain when splices or tapping connections must be made. The linemen are therefore instructed to disregard polarity entirely, and their main efforts are directed to keeping the line insulation at the highest possible level.

The observer determines the polarity of the particular channel by noting the direction of the initial throw of the trace on the oscillograph screen upon turning on the particular amplifier (by means of S_4). Since the amplifier tubes warm up slowly, the movement of the trace is easily followed. If the initial throw is incorrect, the switch S_3 is thrown in the opposite direction, thus rectifying the polarity. These operations provide a further check on the condition of the transmission line and the amplifier's operation.

While it may seem that these testing and telephone control circuits are superfluous items which could be omitted, actual field experience in the control of operations will quickly show the usefulness of the added controls. There is also no great increase in complexity by these controls as all circuits either run directly through the control panel or vertically to the supply equipment. This makes for absolute simplicity in wiring, and with quality apparatus such as demanded by field equipment, there are no difficulties from the standpoint of reliability.

As a complement to the remote-control amplifier system, shooting operations are also remotely controlled. Figure 5 shows a schematic diagram of the principal shooting

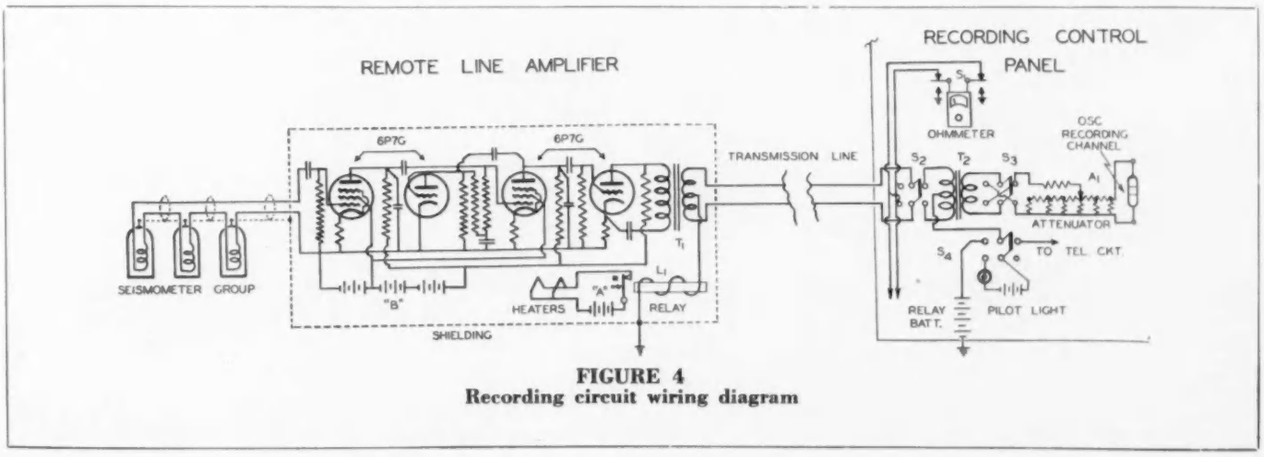

FIGURE 4
Recording circuit wiring diagram

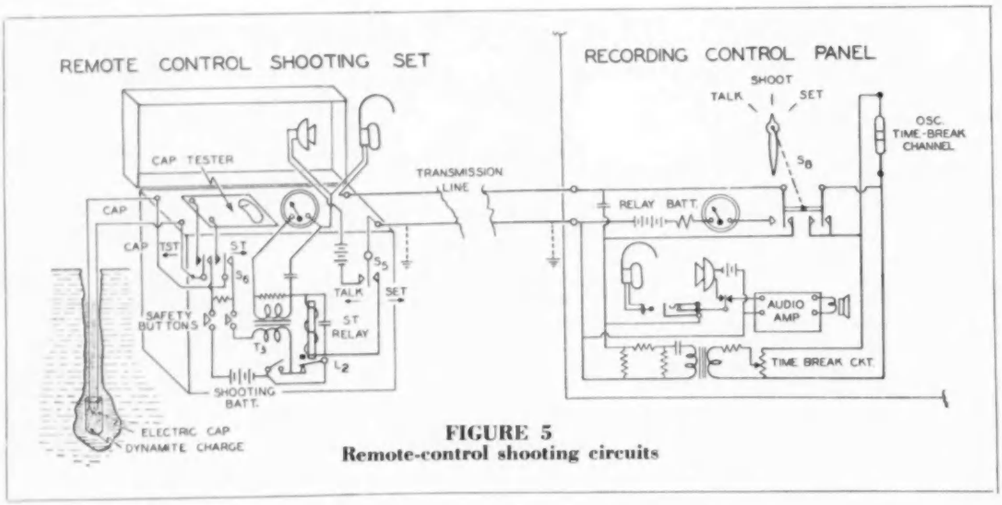

FIGURE 5
Remote-control shooting circuits

and time-break recording circuits. These comprise a remote-control shooting set, shown in Figure 6, in which the necessary shooting battery, relay, and talking circuits are incorporated, together with the telephone equipment at the recording position. A separate transmission line is used between the shooting set and the recording control panel. This may be a two-wire line, or a single wire with ground return.

Voice communication over the shooting line is obtained by throwing the switch S_5 (Figure 5) on the shooting set, and the three-position switch S_8 on the recording control panel both to the "talk" position. When the observer desires to detonate the dynamite charge, he informs the shooter and orders him to "prepare to shoot." The shooter then throws the switch S_5 to the "set" position and waits until the milliammeter on the panel indicates mid-scale deflection. This occurs when the observer throws switch S_8 to the "set" position, which places a 22½-volt relay battery on the line and energizes the shooting relay L_2 as indicated by the milliammeter reading. The shooter then throws S_6 to "shoot" and depresses the safety buttons (noting that the area in the vicinity of the casing is clear of personnel).

At the exact moment the observer desires to fire the shot, he releases S_8 to the "shoot" position. This interrupts the 22½-volt battery current and de-energizes the shooting relay winding L_2. The latter then releases, closing the shooting battery circuit and detonating the charge.

The time-break circuits are such as to provide on the oscillographic record the instant of the "make" of the electric cap circuit, and the instant of the "break" or fusing of the cap bridge which detonates the dynamite charge. This results in a clearly identifiable pattern for the time-break on the record. After the shot, the speech circuits are again placed in operation by throwing S_5 and S_8 to "talk" positions.

The auxiliary circuits shown in Figure 5 are incorporated to speed up operations. These include the cap-line continuity tester, which utilizes a standard cap tester; likewise, a speech amplifier and loud speaker is included for the observer. This is of considerable help and convenience to the observer for he is in constant communication with several linemen for long periods.

Conclusions

The remote-control system described differs very markedly in its physical components from the more common recording equipment. None the less, the overall electrical characteristics and performance of the system approximate very closely those of more conventional recording systems. Thus the oscillographic records obtained are substantially equivalent to those recorded with more conventional equipment. The flexibility of the remote-control feature, however, makes possible satisfactory detailed prospecting of areas which could otherwise barely be touched or perhaps not even surveyed.

This type of equipment undoubtedly will become more common than heretofore, and together with other innovations may perhaps end the present stereotyped design of seismic apparatus which seeks to perform with one type of apparatus, functions which could best be met both technically and economically by instruments designed for specific functions.

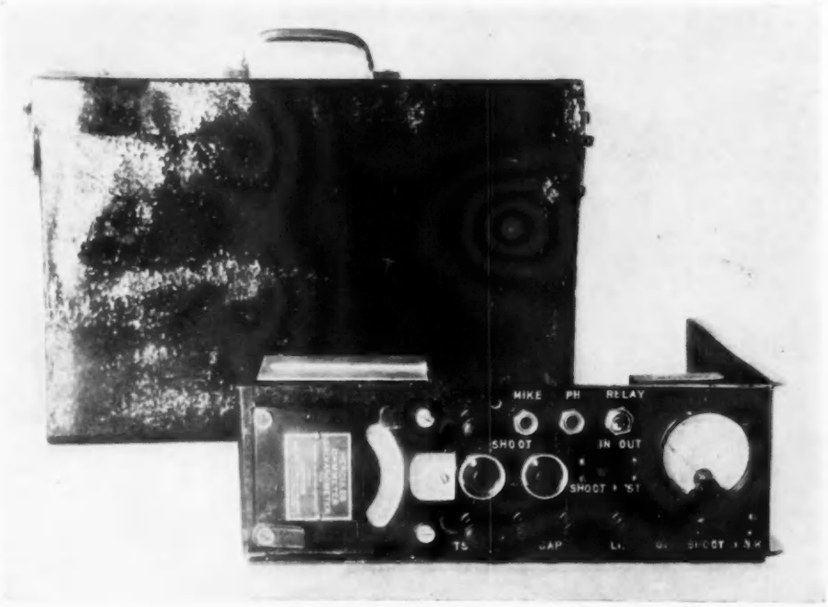

FIGURE 6
Remote-control shooting set

Miles of Smiles

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FIGURE 1
Trend of Dolomite Production in the Texas Panhandle

Optimum Spacing of Dolomite Acreage in the Texas Panhandle

By PARK J. JONES
Petroleum Engineer, Fort Worth, Texas

THE dolomite trend in the Texas Panhandle (see Figure 1) is a reservoir for which there is no evidence of either an effective gas cap or an effective water drive. Based on approximately 300 individual core analyses, the average per-acre ultimate recovery from the trend is known. Now the behavior of gas-oil mixtures in consolidated and unconsolidated sands also is well established.[1] Differences between the said extreme types of media do exist; however, they are a matter of degree only, rather than of kind. Because of the recoveries available, it is known that the behavior of gas-oil mixtures in subject dolomite is essentially no different from the behavior of similar fluids in unconsolidated sands. In other words, the behavior of mixtures in subject, dolomite approximates the permeability saturation curves for unconsolidated sands rather than those for consolidated sands. The reason for this behavior, even though the dolomite permeability is relatively very low, lies in the fact that subject dolomite has a small number of relatively large pores rather than a large number or relatively small pores, as can be verified from representative photographs of subject medium—in view of which, the permeability-saturation discussion in this paper is based on the said relationship for unconsolidated sands.

The equilibrium permeability is of the order 70 percent of the specific permeability, corresponding to which the liquid saturation is approximately 90 percent of the pore space. As the saturation at abandonment in the regions approximately halfway between wells producing from a reservoir having neither an effective gas cap nor an effective water drive corresponds to that of equilibrium permeability, 90 per-

THE author presents data showing that ultimate recovery within 10- to 20-acre limits on the Panhandle dolomite are independent of spacing. Based on the following representative physical data: an allowable of 20 barrels per day per well, irrespective of spacing; 365 operating days per year; an economic limit of 3 barrels per day; an investment of $22,500 per well; an operating cost of $1,800 per well per year, including taxes; a one-eighth royalty; and interest at 6 percent, it appears that, on the average, optimum spacing of the dolomite acreage in the Texas Panhandle is 18 acres per well at the present income of $0.98 per barrel of oil produced. A general statement reads thus: The optimum spacing on the dolomite acreage is 1 well per 136,000 barrels of recoverable oil. This conclusion does not hold if the allowable is not on a per-well basis.

This paper was presented at the Tenth Mid-Year Meeting of the American Petroleum Institute, Division of Production, Fort Worth, Texas, May 29, 1940. The statements and opinions expressed herein are those of the author and should not be construed as an official action or opinion of the Institute nor of this publication.

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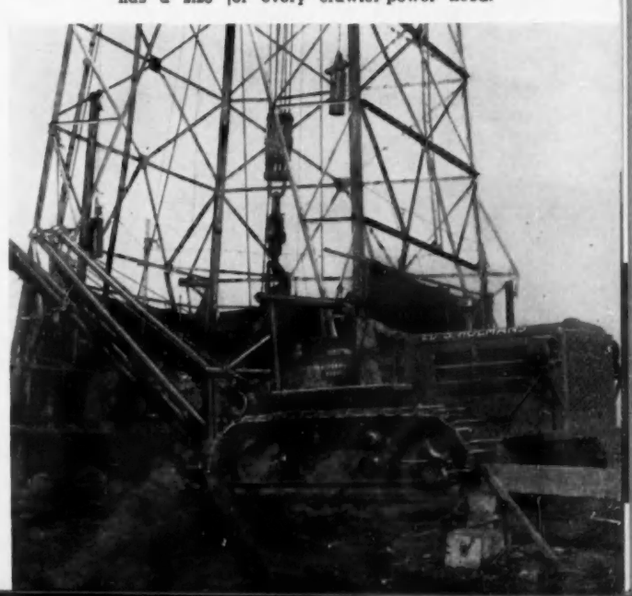

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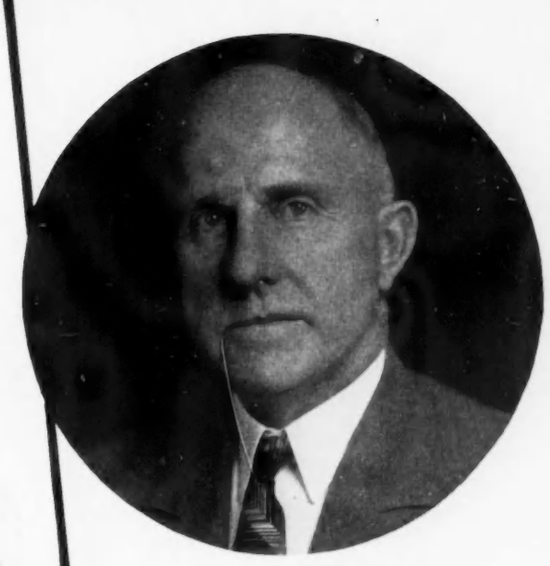
AS AT MAY 1, 1940

ASSETS	
CASH IN BANKS	$ 225,713.21
Customers Receivables Net	1,181,586.44
Inventories	1,585,802.76
Investments in Oil Properties	843,132.59
Fixed Assets, $470,462.98;	
Less Reserve, $235,913.92	234,549.06
Other Sundry Assets	85,085.41
Total	$4,155,869.47

LIABILITIES	
Current Notes Payable	None
Trade Accounts Payable (Not Due)	$ 152,896.72
Sundry Accruals	45,848.80
Term Indebtedness (Not Secured)	
Dated Dec. 10, 1938; Due Feb. 1, 1941	850,000.00
CAPITAL and SURPLUS	3,107,123.95
Total	$4,155,869.47



A. A. Buschow
President and General Manager

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cent saturation is used in this paper for illustrative purposes—even though the actual value is probably 1, or possibly 2, percent less. The region approximately halfway between wells is referred to as the primary zone of maximum saturation or, more briefly, as the primary zone.

Regarding the residual saturation at abandonment in the neighborhood of a well, Muskat[1] and coworkers have shown that it cannot be less than 50 percent, in general; and for subject dolomite in particular it cannot be less than 50 percent, because subject media do not average more than 50 percent oil.

Now, as the cross-sectional area through which gas flows varies with radial distance from a well, the theoretic effective permeability also varies with radial distance (see Figure 2). Corresponding to the theoretic effective permeability, the probable residual-saturation distribution is known. Referring to Figure 2, it will be noted that a line joining the saturations at the boundaries approximates the probable distribution, except in the immediate neighborhood of a well.

Ultimate Recoveries Vs Spacing

As the deviation from linearity in the neighborhood of a well, in general, can be much more pronounced than is indicated in Figure 2, it is necessary to show that this deviation is of no practical consequence. In Figure 3 the distribution of the area contributing to recovery is plotted as a function of the radial distance from a well. It will be noted that the area within 20 percent of the total radial distance averages only 2 percent of the total contributing area. Consequently, even a considerable deviation of saturation distribution from linearity in this region is of no practical significance—in view of which linear distribution of residual saturation approximates the more probable distribution to a sufficient degree of accuracy for practical purposes.

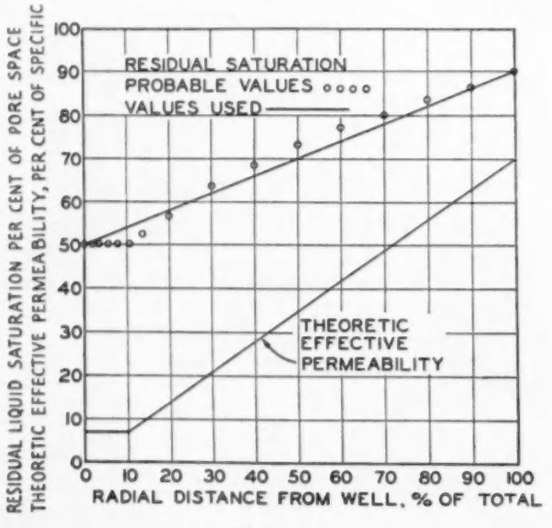

FIGURE 2
Distribution of Residual Saturation at Abandonment

Being given a linear distribution of residual saturation at abandonment, what is the effect of spacing on ultimate recoveries? Let unit spacing be one well on any arbitrarily assigned acreage as, for example, on 20 or on 40 acres; then the corresponding half spacing is 10 and 20 acres, respectively, and the corresponding quarter spacing is 5 and 10 acres, rerespectively. The distribution of residual saturation for unit, half, and for quarter spacing is illustrated, in terms of unit spacing, in Figure 3.

In order to determine the total effective residual saturation, the residual saturation at any point is multiplied by the area contributing to recovery at that point. The sum of all the products thus obtained, when divided by the total contributing area, gives the total effective residual saturation. When this is done for quarter, half, and unit spacing, it can be verified that ultimate recoveries are independent of spacing—provided the pressure at abandonment is identical in all spacings. For example, the ultimate recovery from like 20-acre tracts having 1 well, 2 wells, and 4 wells, respectively, is in each case the same—provided the pressure at abandonment is no different. In the case of the Panhandle dolomite, it will be shown that the abandonment pressure for 2

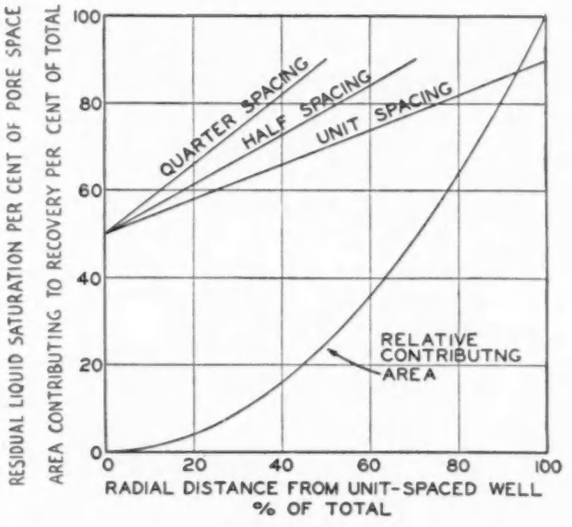

FIGURE 3
Relative Distribution of Residual Saturation at Abandonment

wells on 20 acres and for 1 well on 20 acres, and for any spacing between 10 and 20 acres, is in each instance practically no different. Therefore, the ultimate recovery from subject dolomite is independent of spacing within the 10- to 20-acre limits. In each case the ultimate recovery is the same.

Regarding the numerical value of the total effective residual saturation and of the ultimate recovery, the 50-90 ilustrative distribution gives 80 percent saturation and 20 percent recovery. This recovery figure must be divided by the reservoir-volume factor in order to obtain oil recovery in terms of pore space. The residual-saturation figure must be corrected also for shrinkage. The actual recovery figure for subject dolomite is slightly higher than 20 percent, possibly as high as 21.5 percent, corresponding to which the saturation in the primary zone of maximum saturation is 88 percent. The ultimate recovery from the dolomite trend will average somewhere between 20 and 21.5 percent, divided by the reservoir-volume factor. These limits for an average dolomite well cannot be made to approach each other more closely than they are given here, because it is impossible to core successfully certain oolitic intervals, which

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probably average about 2 feet in thickness over the dolomite trend as a whole.

Physical and Economic Variables

Optimum spacing of oil wells is a function of certain physical and economic variables, as follows:

Economic Variables

Investment required to drill and equip a well.
Interest rate, percent.
Annual allowable rate of recovery, barrels per year.
Economic limit, barrels per day.
Royalty, percent.
Income, dollars per barrel of oil produced.
Operating cost (including taxes), dollars per well per year.

Physical Variables

Volume of oil recoverable at the allowable rate, barrels.
Life of a well prior to its stripper stage, years.
Volume of oil recoverable at a rate less than the allowable, barrels.
Rate of oil recovery during the stripper stage of a well, barrels per year.
Life of a well during its stripper stage, years.

In a particular reservoir, such as the Panhandle dolomite, both the economic and the physical variables are fixed at a given time for a given spacing. Consequently, the optimum spacing, or that spacing for which the present worth of future earnings is a maximum, is determinable—provided the physical variables can be ascertained for any arbitrarily chosen spacing.

Physical Data

One method of ascertaining the numerical values of the physical variables is based on a particular application of fluid, reservoir, and core data—these including the following:

Reservoir and Fluid Data for Panhandle Dolomite

Original reservoir pressure=450 psi=P_R
Reservoir temperature=90° F
Bubble-point gas-oil ratio at original reservoir conditions=240 cubic feet per barrel.
Viscosity of dead oil at 90° F=5.6 centipoises
Viscosity of saturated oil under reservoir conditions=2.4 centipoises
Reservoir-volume factor (barrels in place divided by barrels of recovery)=1.1

Core Data Representative of Panhandle Dolomite

Effective pay thickness=40 feet
Specific permeability =15 millidarcys
Effective porosity =12 percent
Residual-oil content =22 percent of the effective pore space
Residual-water content=45 percent of the effective pore space

From the foregoing data the core recovery from average Panhandle dolomite acreage is obtained as follows:

	Barrels Per Acre
Voids available to oil plus gas plus water	=37,200
Voids occupied by water	=16,800
Voids originally occupied by oil plus gas	=20,400
Voids originally occupied by oil alone	=18,600
Non-recovery of oil from core	= 8,200
Oil recovery from core=C=	=10,400

Being given that C barrels per acre have been expelled from a core, the pressure on which had been reduced from P_R pounds down to atmospheric pressure, it is certain that the recovery therefrom, corresponding to any pressure P greater than atmospheric, is not less than:

$$\text{Core recovery}=C\,\frac{P_R-P}{P_R}\ \text{(barrels per acre)} \qquad (1)$$

The fraction $\frac{P_R-P}{P_R}$ is pressure decline divided by the original reservoir pressure, and is referred to as the pressure factor. As the overall value of C is a minimum, core recovery per pound pressure drop corresponding to pressures sizably higher than atmospheric can be greater than those given in equation (1).

Now, if production efficiency in a reservoir were equal to that in a core representative of that reservoir, the recovery from a reservoir also would be given by equation (1). However, production efficiency in a reservoir may be different from that in a core; and, in general, it also may vary with pressure. But, if the production efficiency in a reservoir relative to that in a core is represented by an efficiency factor E, then the recovery V_i available over any pressure-decline interval is given by:

$$V_i=\frac{CE_i}{P_R}\left[\,(P_R-P_i)-E_{i-1}\,(P_R-P_{i-1})\,\right] \qquad (2)$$

and the total recovery V is thence the sum of the individual values, or:

$$V=\sum_{i=1}^{i=n} V_i \qquad (3)$$

Equations (2) and (3) are sufficient to evaluate recoveries; but, in order to apply them, it is necessary to ascertain pressure distribution in a reservoir from the bore of a well outward.

Pressure Distribution

The significant pressures are those at the time a well can just make its allowable and those at abandonment. Pressure distribution in the case of constant effective permeability and viscosity is given by:

$$P=\frac{Q\mu}{3.07\ Kh}\log 10\frac{R}{r} \qquad (4)$$

Where:
Q=rate of oil recovery, barrels per day.
μ=effective viscosity, in centipoises.
K=effective permeability, in darcys.
h=effective pay thickness, in feet.
R=half the distance between wells, in feet.
r=effective radius of well bore, in feet.

The particular values of Q for the problem on hand are 20 barrels per day and 3 barrels per day, which are

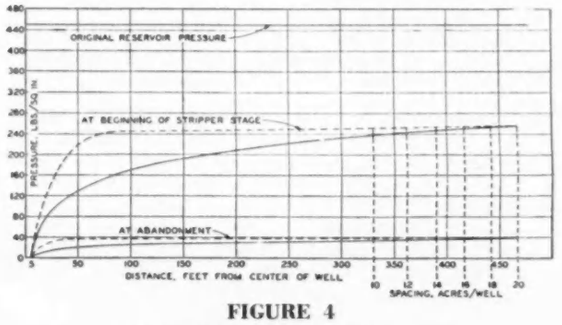

FIGURE 4
Probable Pressure Distribution

the rates of recovery just prior to the stripper stage and at abandonment, respectively. As for radial flow, pressure distribution is controlled by the pressure drop in the immediate neighborhood of a well; the numerical values of the effective viscosity and of the effective permeability must be those which exist in the vicinity of the bore of a well. As the viscosity of the dead oil at reservoir temperature is 5.6, and as some gas remains in solution, the effective viscosity is taken at 4.0 centipoises. Regarding effective permeability, Muskat[1] and Botset[2] have shown that it cannot be less than a certain minimum depending on the saturation. For the purposes

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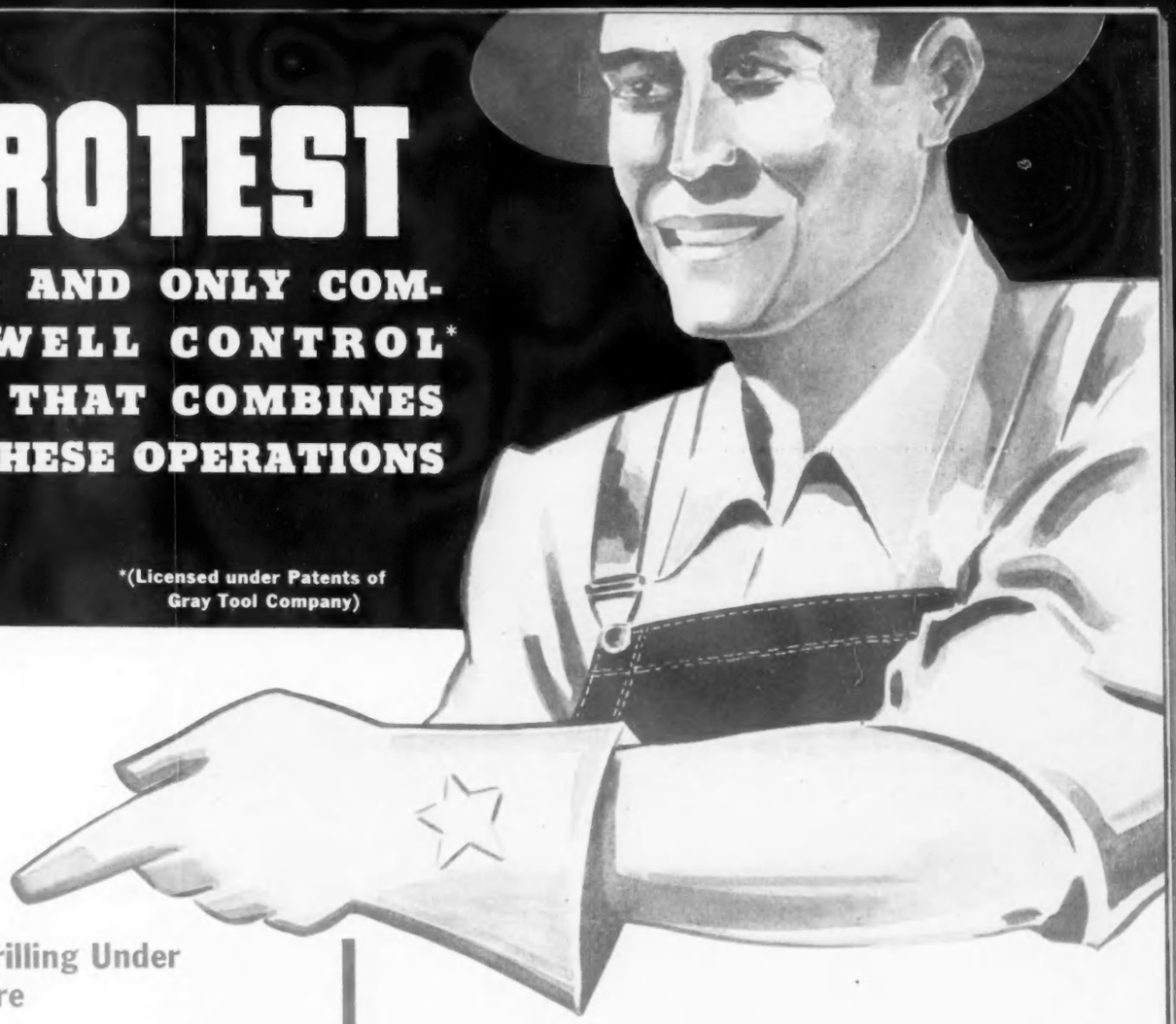

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of calculating the pressures at halfway between wells, 5 millidarcys is used for the effective permeability, which is one-third of subject media's specific permeability. The effective pay thickness is known from core data, and is equal to 40 feet. The value of R, the drainage radius, is known for any assumed spacing. The effective well radius r depends on the conditions resulting from shooting and/or acidizing a well. Studies indicate, to a virtual certainty, that the effective radius in the dolomite is not less than 5 feet. Substituting all of the foregoing values in equation (4), the two pertinent pressures are obtained readily on the assumption that the effective permeability is everywhere equal to one-third of the specific permeability (see solid curves in Figure 4). By using the said effective permeability, it amounts to a virtual certainty that the pressure at the most distant point from which a well produces oil is not less than that indicated. Of course, the pressure at the most distant point may be less, but there is considerable doubt as to how much less. In other words, the above method is used only for the purpose of establishing the pressure at the most distant point, because shut-in bottom-hole pressures indicate definitely that the pressures thus ascertained are not less than the observed pressures.

Turning now to pressure distribution, it is known that the effective permeability decreases rapidly with reductions in oil saturation. As oil saturation in the neighborhood of a well is considerably less relative to that at more distant points, the pressure gradient within the first 100 feet of a well is much steeper than is indicated by the solid curves. Furthermore, it is known also that the effective permeability at roughly halfway between two producing wells is equal to equilibrium permeability, which is 0.7 of the specific permeability. In view of these facts, together with a consideration of residual-saturation distribution, calculations indicate that the probable pressure distribution is as indicated by the dashed lines in Figure 4. In other words, corresponding to low rates of recovery as, for instance, 20 barrels per day, the pressures at the beginning of the stripper stage, as well as those at abandonment, for 1 well on 20 acres are practically no different from the corresponding pressures for 1 well on 10 acres.

Recoveries Prior to the Stripper Stage

Knowing the pressure distribution at the beginning of the stripper stage, the recoveries available prior to the stripper stage and their present worths are obtained as shown in Table 1.

The pressure P in line (2) in Table 1 corresponding to a given spacing is obtained from Figure 2. The pressure factor in line (3) equals $\frac{450-254}{450}$. The recoveries listed in line (4) are the products 10,400 times spacing times pressure factor times 1. The last-mentioned factor is reservoir-production efficiency relative to core-production efficiency, and the reason this factor is taken at unity for recoveries prior to the stripper stage lies in the fact that oil is, and has been, produced with an efficiency which is no less than the overall core efficiency. Thus, core efficiency equals $\frac{10,400}{18,600}$, or 56 percent. As the bubble-point gas-oil ratio is 240 cubic feet per barrel, oil is expelled from an average core with an overall gas-oil ration equal to $\frac{240}{0.56}$, or 430 cubic feet per barrel. But the dolomite wells have been producing oil with a gas-oil ratio equal to, or even less than, 430 cubic feet per barrel. Therefore, prior to the stripper stage, reservoir-production efficiency is not less than the overall production efficiency from a core.

As the allowable, irrespective of spacing, is 20 times 365, or 7300 barrels per year, the life of a well prior to its stripper stage is known. As money normally is worth 6 percent, the proper 6 percent present-worth factor times the recovery gives the present worth of the production prior to the stripper stage, in terms of barrels of oil.

Recoveries During the Stripper Stage

During the stripper stage in the life of the dolomite wells, the rate of recovery will decline from 20 barrels per day down to a 3-barrel-per-day economic limit. In the interim, during which the available rate of recovery becomes progressively less and less, the rate of decline for a given spacing is practically constant. Knowing the pressure distribution at abandonment, the recoveries available during the stripper stage and their present worths are ascertained as shown in Table 2.

As the pressure at abandonment is essentially no different from 36 pounds, irrespective of the spacing herein considered, the pressure factor is $\frac{450-36}{450}$, or 0.92. Now, if recovery down to 36 pounds could be had at core efficiency, it would amount to 10,400 times spacing times 0.92, or the values listed in line (3). If from the values listed in line (3) the recoveries listed in line (4) of Table 1 are subtracted, the result is line (5), or theoretic stripper recovery. But during the stripper stage, reservoir-recovery efficiency—depending on permeability distribution—will be only a fraction of the core overall efficiency. For the dolomite acreage it is problematic as to whether reservoir efficiency during the

TABLE 1
Recoveries Prior to the Stripper Stage

1. Spacing, acres per well	10	12	14	16	18	20
2. Pressure, pounds per square inch	254	254	254	254	254	254
3. Pressure factor	0.435	0.435	0.435	0.435	0.435	0.435
4. Recoveries, thousands of barrels	45.0	54.0	63.0	72.0	81.0	90.0
5. Life prior to stripper stage, years	6.2	7.4	8.6	9.9	11.0	12.3
6. Present-worth factor	0.84	0.81	0.79	0.757	0.738	0.714
7. Present worth, thousands of barrels	37.8	43.7	49.8	54.5	59.7	64.1

TABLE 2
Recoveries During Stripper Stage

1. Spacing, acres per well	10	12	14	16	18	20
2. Pressure factor	0.92	0.92	0.92	0.92	0.92	0.92
3. Theoretic total recovery, thousands of barrels	95.5	114.8	133.9	153.0	172.0	191.0
4. Prior recovery, thousands of barrels	45.0	54.0	63.0	72.0	81.0	90.0
5. Theoretic stripper recovery, thousands of barrels	50.5	60.8	70.9	81.0	91 0	101.0
6. Actual stripper recovery, thousands of barrels	30.3	36.5	42.5	48.6	54.6	60.6
7. Stripper life, years	9.3	11.1	13.0	14.8	16.7	18.5
8. Discount factor for (7)	0.82	0.79	0.77	0.75	0.73	0.70
9. Discount factor for (5) Table 6	0.70	0.64	0.60	0.56	0.527	0 48
10. Present-worth factor, (8) times (9)	0.57	0.505	0.462	0 42	0.385	0 336
11. Present worth, thousands of barrels	17.3	18.5	19.7	20.4	21.0	20.4

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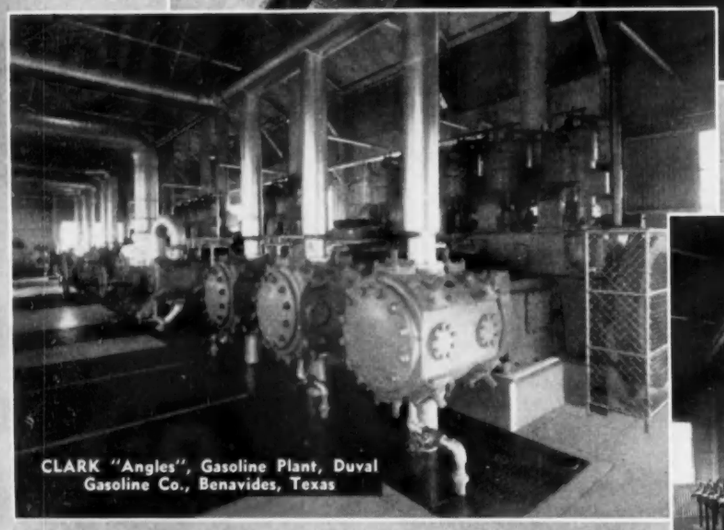

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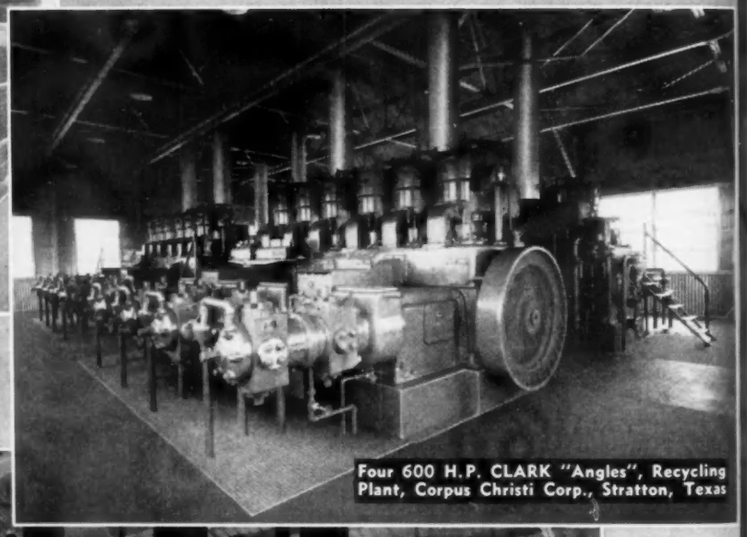

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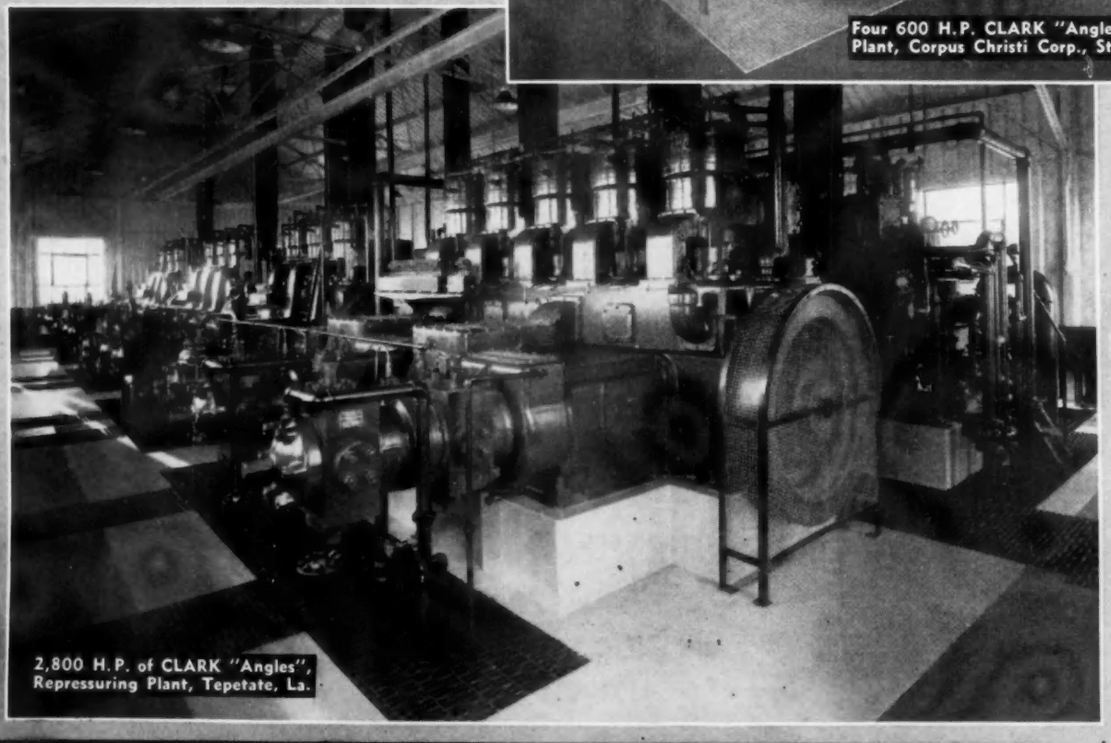

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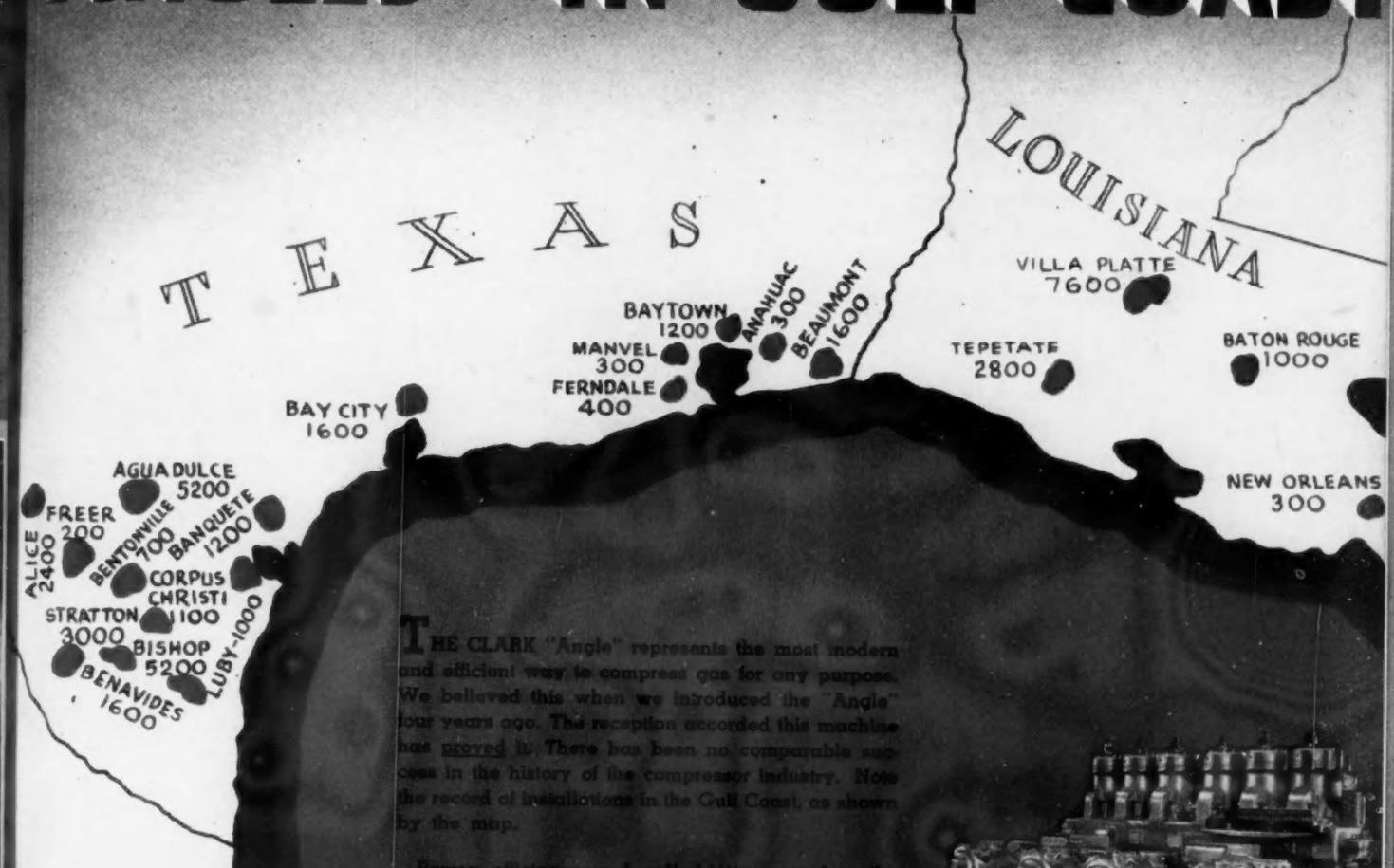

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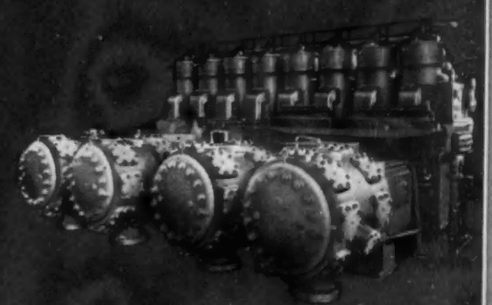

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TABLE 3
Present Worth of Ultimate Recovery from Average Dolomite Acreage

Spacing, acres per well	10	12	14	16	18	20
Ultimate recovery, thousands of barrels	75.3	90.5	105.5	120.6	135.6	150.6
Ultimate recovery, barrels per acre	7,500	7,500	7,500	7,500	7,500	7,500
Life of wells, years	15.5	18.5	21.6	24.7	27.7	30.8
Present worth after 1/8 royalty, thousands of barrels	48.2	54.5	60.8	65.5	70.7	74.0
Present worth after 1/8 royalty at an income of $0.98 per barrel, thousands of dollars per well	47.2	53.4	59.6	64.2	69.3	72.5

TABLE 4
Present Worth of Total Outgo, Dollars Per Well

Spacing, acres per well	10	12	14	16	18	20
Investment, dollars per well	22,500	22,500	22,500	22,500	22,500	22,500
Discounted operating cost, dollars per well	18,400	20,400	22,100	23,600	24,600	25,500
Present worth of total outgo, dollars per well	40,900	42,900	44,600	46,100	47,100	48,000

TABLE 5
Present Worth of Future Earnings, Dollars Per Acre

Spacing, acres per well	10	12	14	16	18	20
Present worth of earnings, dollars per acre	630	875	1,070	1,130	1,230	1,225

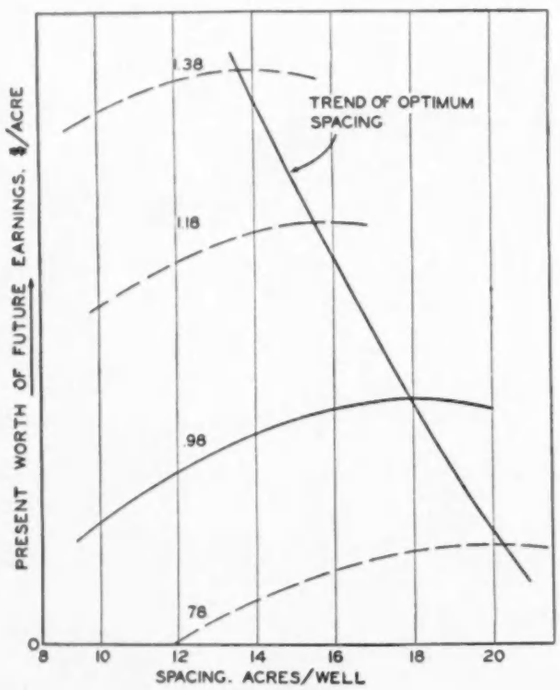

FIGURE 5
Optimum Spacing Trend

stripper stage will be greater than 60 percent of the overall core efficiency. Whence, at 60 percent efficiency, the actual stripper recovery, line (6), is equal to 0.6 times the theoretic stripper recovery.

The stripper life of well is obtained with the aid of decline curves. Values listed in line (7) of Table 2 are obtained in that manner. The present worth of a stripper reserve is ascertained quickly with the aid of certain valuation tables. Such tables are not included herein, but an example of them will be found in the December 13, 1937 issue of THE OIL WEEKLY.[3] A stripper reserve multiplied by its proper composite factor, and again by a present-worth factor corresponding to the life of a well prior to its stripper stage, gives the present worth of the stripper reserves.

Ultimate Recoveries

By combining the values listed in Tables 1 and 2, Table 3 is obtained.

Present Worth of Total Outgo

As the annual operating cost, which includes taxes, is approximately $1800 per well per year, the sum discounted at 6 percent is the present worth of the operating cost. As the investment for drilling and equipping is approximately $22,500 per well, this amount added to the present worth of the operating cost is the present worth of the total expenditures required to produce the recoverable oil (Table 4).

Present Worth of Future Earnings

The present worth of future earnings (profits before overhead) for various spacings, as obtained from Tables 3 and 4, is shown in Table 5.

The values listed in Table 5 are the present worths of future earnings after operating cost, taxes, and amortization of the $22,500-per-well investment, but before overhead. Overhead should be deducted from the earnings listed in Table 5.

Also it should be noted that the present worth of future earnings for 10-acre spacing is $630 per acre, whereas for 18-acre spacing the corresponding figure is $1230 per acre. Whence optimum spacing on average dolomite acreage reduces the cost of production by $600 per acre.

Table 5 is based on an income of $0.98 per barrel. Optimum spacing for an income other than $0.98 per barrel, in general, is different. The trend of optimum spacing as influenced by different incomes is indicated in Figure 5.

Conclusion

The foregoing analysis indicates that optimum spacing in the Texas Panhandle on the dolomite trend is, on the average, 1 well per 18 acres. As the recovery available from 18 average acres is 136,000 barrels, and as per acre recoveries vary, the more general conclusion reads thus: Optimum spacing on the dolomite trend is 1 well per 136,000 barrels of recoverable oil. This conclusion does not hold if the allowable is not on a per-well basis.

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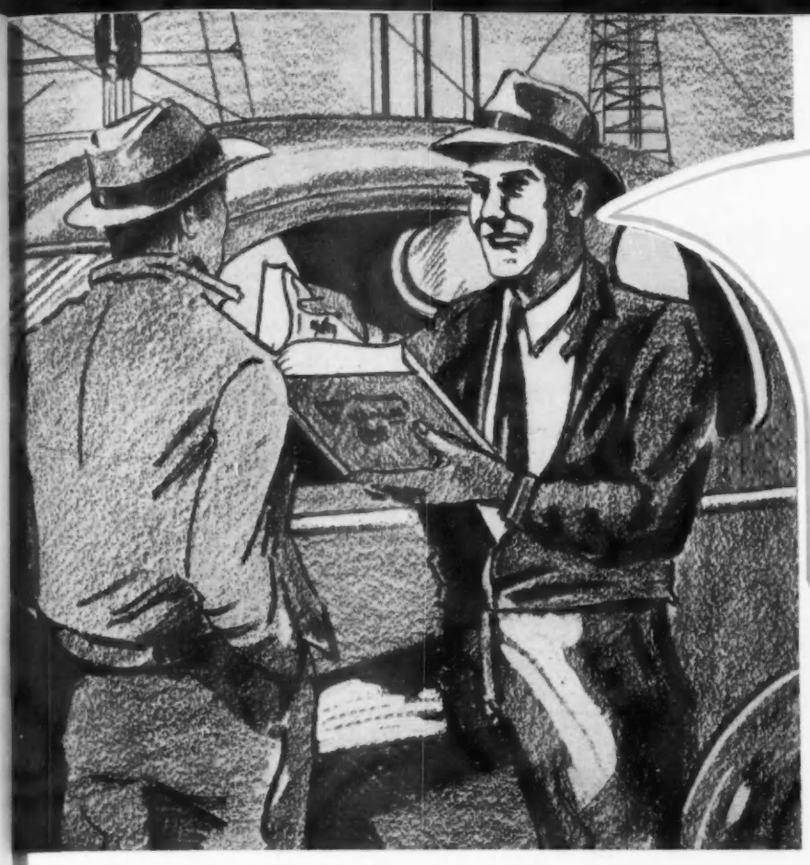
[2] H. G. Botset, "Flow of Gas-Liquid Mixtures Through Consolidated Sands," *Trans. Am. Inst. Mining Met. Engrs.* (*Petroleum Technology*) Nov. (1939).

[3] A. B. Morris, "An Evaluation Table with Limiting Factors," THE OIL WEEKLY **88** [1] 38 (1937).



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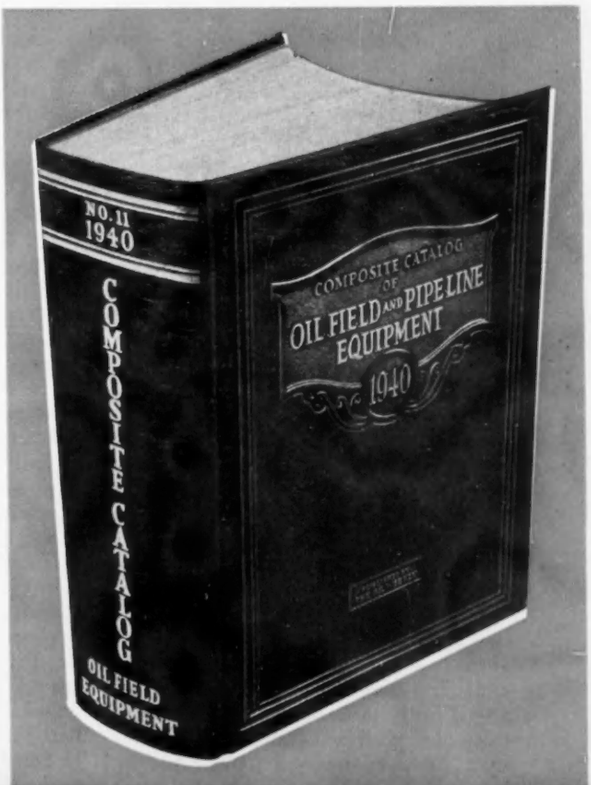

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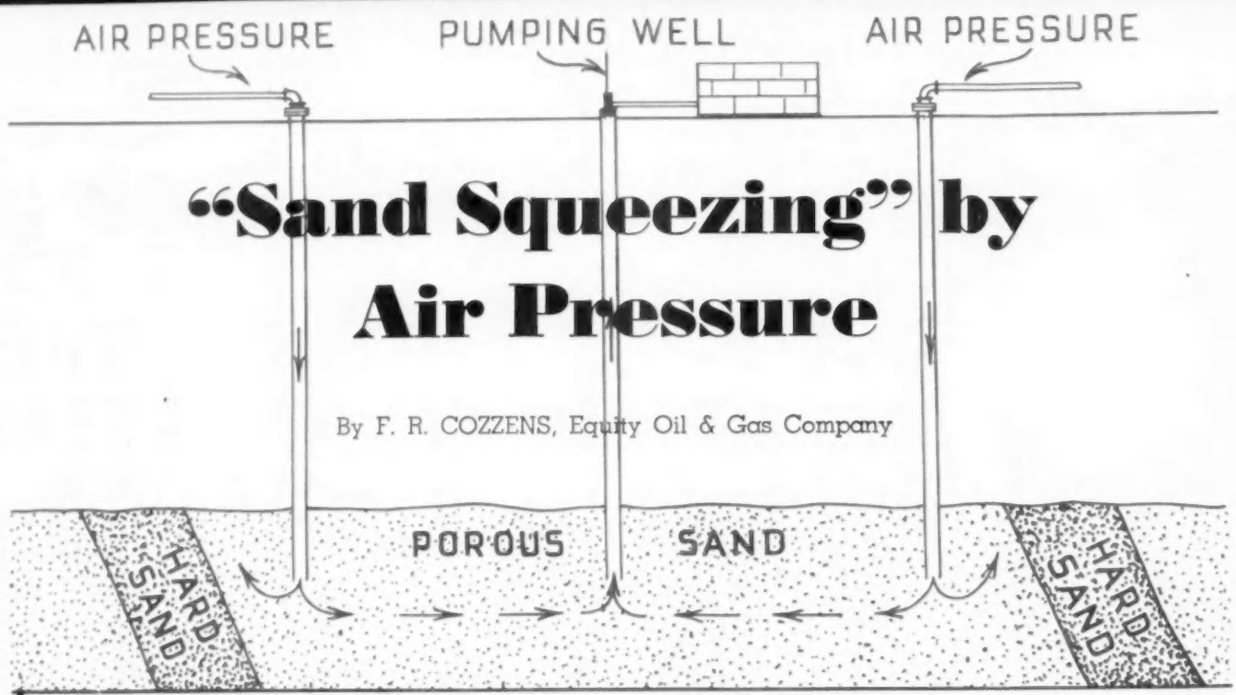

"Sand Squeezing" by Air Pressure

By F. R. COZZENS, Equity Oil & Gas Company

AN oil sand that has been air-pressured continuously over a course of years, then abandoned, hardly seems a likely project for reclamation—especially when the method calls for further pressuring. In the Southeastern Ohio stripper fields where air was first introduced in 1915 and used until abandonment began in 1930, much doubtful territory is being brought back into profitable production by building a two-way air pressure in the porous sections of the sand body. In field parlance, this is known as sand-squeezing, and the purpose is to reclaim oil reserves which have been pushed back into the sand by former pressuring.

In taking over a repressuring job, the operator is aware that his pay sand is for the most part porous, and that its porosity is broken at irregular intervals by faults or hard, flinty streaks which form a barrier to both oil and gas. Since there are always stretches of soft, porous sand between these faults, it is reasonable to assume that the former air pressure in passing through the sand body has met the barriers and whatever fluid was being pushed ahead has been dammed up against them. By checking the records of former drilling, the operator finds occasional wells where the log reads that the sand was broken, hard, and flinty, which clearly indicates that the well was actually drilled into, or very near, a sand-fault or barrier. After two such wells have been discovered in the same streak of pay, the operator fits in special casing heads and starts air from a stationary compressor down both holes at the same time, giving each well all the pressure the sand will take. By starting pressure as equally as possible at both barriers, any reservoirs or pockets of oil are gradually forced out into the porous sections of sand, and toward the center. Wells in that area are pumped vigorously and air pressure is continued as production justifies.

By this method, thousands of barrels of oil are often reclaimed from stretches of sand less than a mile in length, and sometimes, a reclaimed reservoir proves sufficient to pay for an entire lease. In the average district, several stretches of sand can be worked from one compressor at the same time, thus reducing operating costs.

In checking the records of original drillings, it is often found that barrier wells, necessary in re-pressuring, have been pulled out and plugged. Where records of such wells indicate a stretch of sand that has shown any peculiar activity under former methods, it is usually found advisable to redrill the locations. By doing so, the operator often solves, to his own advantage, many mysteries which puzzled the former owner. In an Ohio stripper field, a stretch of virgin sand more than two miles in length was discovered recently in this way, which showed no traces of air, although its location was in the heart of a district which had been air pressured continuously for more than 15 years. The reclaimed production, which averages around 200 barrels per month, was made possible by the fact that the former owner had neglected to consider the presence of sand-barriers in his pressuring methods.

Another common discovery is that barriers retard sand drainage over long distances, and that a sand showing frequent faults or barriers will remain productive over a much longer period than will a sand showing but few faults. Still another fact is that an extremely hard, flinty barrier is invariably followed by a loose, pebbly, and productive stretch of sand.

The log, or record book of original drillings is one of the reclamation operator's most valuable possessions. By checking sand barriers, he repressures to salvage oil between them, and where the records reveal a wide streak of pay, he is able to repressure edge wells, and using the barriers as an air-buffer, force oil reserves to pumping wells in the center. If the operator is possessor of natural gas which can be piped in economically from other districts, he uses it under pressure, instead of air. Results are more rapid, since the circulation of gas stimulates oil flow and reduces the volume of paraffin and sludge. The gas is later recaptured at the producing wells, so that waste is reduced to a minimum. Redrilling for this type of pressuring, either with air or gas, is done usually with a spudder. Since barrier wells require no shooting nor cleaning out, the cost averages less than $1.00 per foot. Light weight casing is used. The amount of air pressure required for the purpose varies with the type and quantity of sand. A maximum of 500 pounds pressure at the casing head generally is sufficient. In this way, a stationary compressor with 2-inch lines accommodates a project a mile in scope.

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Surplus Gasoline and Smaller Exports Handicap Industry

[*Continued from page 14*]

surplus of at least 15,000,000 barrels, being that much greater than the over-large inventory of a year ago, while total demand is up only a small percentage, with exports down sharply.

While the weakness of gasoline has been the most serious difficulty in the industry's markets, there has been a protracted decline in prices of lubricants, which finally has caused a 25-cent reduction in the postings for Pennsylvania grade crude.

The past few weeks have brought, moreover, reductions in wholesale prices of kerosene, light fuel oils, and heavy fuel oils, although the lowering of the heating oil quotations may have been primarily of seasonal nature.

Demand Situation

Total demand for United States petroleum has set new records this year, despite curtailed exports, as domestic consumption has exceeded all previous peaks, with all products in wide use. However, as the year has progressed, the margin of increase over 1939 curves has narrowed. In March, latest month for which official figures are available, the gains over 1939 were smaller than those for the opening months of the year.

In the first three months of 1940, total demand for United States petroleum was 6.6 percent greater than that in the corresponding months of 1939, on a daily average basis. Domestic demand was up 10.8 percent, but total exports were down 22.7 percent, as shipments of crude oil were down 18.8 percent and those of refined products 24.8 percent.

All corresponding figures for March were lower, total demand having been 4.4 percent larger than in March, 1939, as a 9.3 percent gain in domestic consumption was offset to a large extent by a 36.5 percent decrease in total exports, with crude shipments down 18.5 percent and refined oil exports off 30.1 percent.

Virtually all refined products show, for both the first three months and March, increases in domestic demand and decreases in exports, when 1940 figures are compared with 1939 data. The only products that have been exported in increased quantities following outbreak of the European war have been aviation gasoline, lubricants, and wax.

In the first seven months of the war, exports of United States crude and refined oils totaled 92,279,000 barrels, about 10,000,000 barrels, or 10 percent, less than the 102,343,000 barrels shipped out in the corresponding seven months a year earlier. Crude oil shipments were down 4.5 percent for the period, while refined products in the aggregate showed a decrease of 12.9 percent. The most important loss of business has been that in shipments of ordinary gasoline, which were 8,000,000 barrels, or 28 percent, smaller in the first seven months of the war than in the comparable months a year before. Exports of heavy fuel oils meanwhile were down about 2,500,000 barrels, or 23 percent. Shipments of kerosene and light fuel oils also have contracted. Details of the trends in exports of the various products since the beginning of the war appear in an accompanying table.

Similarly, recent trends in domestic consumption of the different products are shown in another table.

In view of the prevailing demands for the various refined products, present inventories of those oils are generally satisfactory, with exception of the previously mentioned surplus stocks of gasoline and the inadequate supplies of heating oils. In one of the tables presented herewith, inventories of the various products are compared with those held a year ago.

Following the effectiveness of the Venezuelan trade agreement at the middle of December, domestic oil producers have had to make room in their markets for materially increased imports of foreign crude and fuel oils. As shown in a table, imports aggregated 14,364,000 barrels in the first three months of 1940, compared with only 5,838,000 barrels in the corresponding months of 1939. Imports of crude oil were up to 6,902,000 barrels from 4,043,000, and those of refined products, mostly fuel oil, were up to 14,364,000 barrels from 5,838,000. The imports of both crude and refined oils were especially heavy in March.

Oil Imports for Domestic Use Up Sharply

Figures indicate barrels and are from Bureau of Mines.

MONTH	Crude Oil	Refined Products	Total
January:			
Jan., 1939	1,373,000	609,000	1,982,000
Jan., 1940	1,664,000	1,321,000	2,985,000
Percent Change	+21.2	+117.1	+52.0
February:			
Feb., 1939	1,266,000	654,000	1,920,000
Feb., 1940	2,343,000	2,731,000	5,074,000
Percent Change	+85.0	+320.0	+164.0
March:			
Mar., 1939	1,404,000	659,000	2,063,000
Mar., 1940	2,895,000	3,410,000	6,305,000
Percent Change	+106.2	+417.4	+205.6
1st 3 Months:			
1939	4,043,000	1,795,000	5,838,000
1940	6,902,000	7,462,000	14,364,000
Percent Change	+70.7	+315.6	+146.0

Oil Exports Down Sharply in First Seven Months of War

(Figures indicate barrels, except as otherwise noted)

	SEVEN MONTHS PERIOD			MONTH OF MARCH		
	Ending March 31, 1939	Ending March 31, 1940	Percent Change	1939	1940	Percent Change
Item:						
Crude oil	37,095,000	35,430,000	— 4.5	4,966,000	4,046,000	— 18.5
Products:						
Motor fuel	28,058,000	19,813,000	— 28.4	4,336,000	[5]2,265,000	— 47.7
Aviation gasoline	[1]1,127,000	[2]1,462,000	+ 29.7	392,000	249,000	— 36.5
Kerosene	4,516,000	3,877,000	— 14.2	546,000	485,000	— 11.2
Gas oil and distillate	15,415,000	14,986,000	— 2.8	2,924,000	2,318,000	— 20.7
Residual fuel oil	10,681,000	8,196,000	— 23.3	2,047,000	932,000	— 54.5
Lubricants	5,302,000	7,847,000	+ 48.0	829,000	1,193,000	+ 43.9
Wax (thousands of pounds)	148,809	151,429	+ 1.8	26,384	25,642	— 2.8
Coke (short tons)	103,000	147,700	+ 42.7	9,800	13,700	+ 39.8
Asphalt (short tons)	31,600	374,800	+1086.0	2,700	[3]18,900	.....
Miscellaneous	61,000	440,000	+ 621.3	9,000	126,000	+1300.0
[4]Total Refined Products	65,248,000	56,849,000	— 12.9	10,849,000	[6]7,583,000	— 30.1
Total Crude and Products	102,343,000	92,279,000	— 9.8	15,815,000	11,629,000	— 26.5

[1] September, October, November, 1938, not included. [2] September, 1939, not included. [3] Beginning January, 1940, includes both manufactured and unmanufactured asphalt; only unmanufactured asphalt being previously shown. [4] Not the sum of above figures, some of which do not indicate barrels. [5] Includes benzol, 9,000 barrels in March, 1940. [6] Exclusive of 13,000 barrels exported from non-contiguous territories, but inclusive of 748,000 barrels shipped from U. S. to territories.

Above figures from Bureau of Foreign and Domestic Commerce.

DRILLING CONTRACTORS' NOTEBOOK

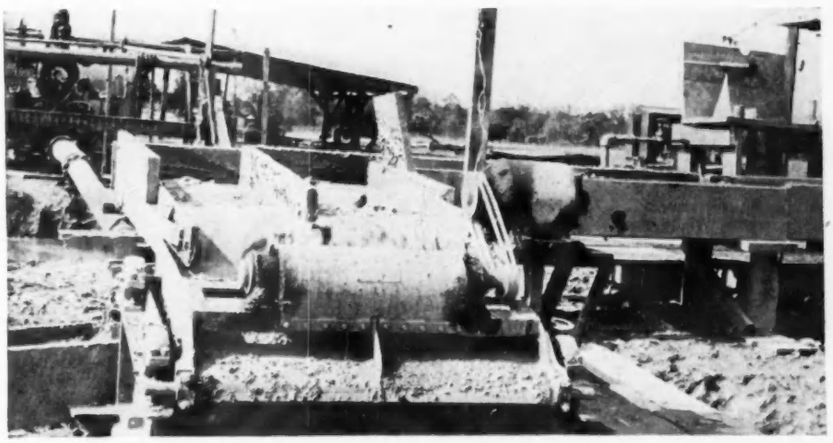
Helpful Suggestions For Those Interested In Drilling Methods

Operating Ideas Maintenance Hints New Rig Hook-ups

Published as a regular feature of THE OIL WEEKLY

1. MUD HANDLING

Flow Is Retarded and Mud Distributed Evenly by Divided Flume to Shale Shaker



A divided flume to the shale shaker checks the mud flow and provides a more even distribution of materials across the entire face of the mud screen.

THE Sultana Drilling Company uses a conventional flume for carrying the mud stream from the rig, introducing a longitudinal dividing wall eight or ten feet from the turn so as to split the stream into two equal parts. These two streams, striking the right angle diverting the mud to the shaker screen, are spread across the entire width of the screen instead of being banked by current force against the outer side of the flume.

As a result of the divided stream and change in flow direction, uniform spread of mud across the entire screen, with consequent use of the entire screening surface, is obtained. Checking of cuttings coming out on the screen affords conclusive evidence of the effectiveness of the method of splitting the stream to secure uniform density of the mud before screening.

This housing protects the generator and its power plant, holding them as a unit mounted on pipe-skid base.

2. GENERATOR CARE

Metal Housing Provides Weather Protection

A GENERATOR and compressor unit are completely housed in a sheet-steel enclosure at a rig of Kirk-Green-Way in the Coyle Pool, Oklahoma. Mounted on a skid base, it may be easily winched to a truck.

A gas engine drives the generator and compressor through a V-belt drive. Exhaust gases are muffled through a silencer above the arched roof. Side and front wings of the housing open to provide adequate cooling.

3. LINE CARE

Halved Crown Block Supports Dead End

GRIMPS, kinks and dog-legs in the dead line may be avoided by affording extended support to the load-carrying section of the line. One drilling contractor secures

Half of a crown block sheave, with lugs welded on to permit bolting to foundation blocking, gives wide support to the dead end of drilling line.

REED DRILL COLLARS.

REED DRILL COLLARS ARE UNDER COMPLETE METALLURGICAL CONTROL—FROM THE SELECTION OF STEEL, THROUGH FORGING AND MACHINING TO THE FINISHED PRODUCT.

. . . ARE TOUGH

Uniform physical qualities, free from stresses and strains . . . concentricity held to extremely close tolerances . . . precision alignment assure users of

REED DRILL COLLARS

LONGER SERVICE LIFE

and

LOWER RIG OPERATING COSTS

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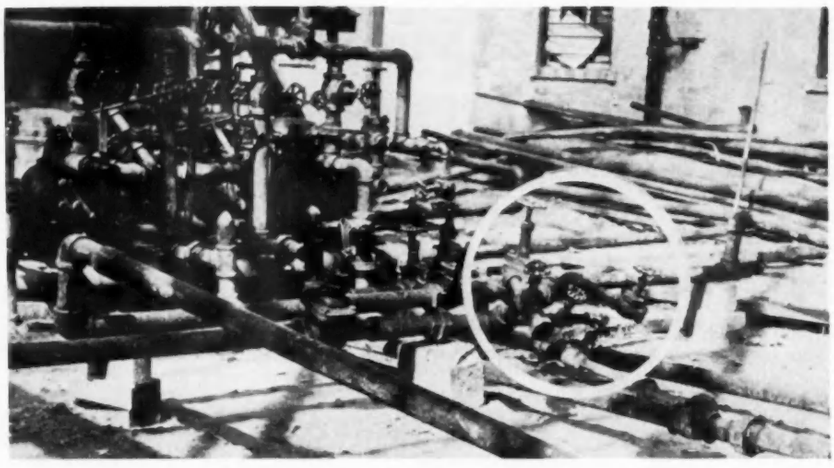
Mid-Continent and Gulf Coast Distributors for MARTIN-DECKER PRODUCTS

this additional area and at the same time facilitates feeding off of new line from the unused coil by splitting a discarded crown block sheave and welding lugs or ears to the ends at the diameter to afford bolting or clamping of the half sheave to the under side of the substructure or blocking upon which it rests.

When so located, the dead line is bent only through a semicircle of the same diameter as that upon which it will work when reaching the working portion of the line. To add more line to replace that being discarded from drum wear, a preventer line is attached to the dead line above the half sheave, and the clamps loosened. As new line is played out around the half sheave and through the clamps, no set or incipient deformation is evident in the section formerly lying within the arc of the supporting device.



Steam snuffer valves, placed between the feed-water unit and boiler fronts, permit instant blanketing of fires in case of a gas blowout or unxpected oil flow.

4. FIRE PROTECTION

Steam Supply May Blanket Boiler

OIL- or gas-fired boilers, especially when using modified Dutch oven fireboxes, contain large areas of incandescent fire brick for some time after the fuel supply is cut off. When drilling in townsite locations, or in formations where a possibility of gas- or oil-blowout is present, means must be provided for closing off or quickly cooling the hot bricks before the inflammable blowout products can reach them and ignite.

By taking off a branch from the steam line supplying the boiler feed pumps, and spotting two gate valves so that one discharges directly toward the firebox end of a boiler, opening a single control valve back of the Y instantly blankets boiler fronts in a cloud of steam, cutting off air access to the boilers and quickly cooling the hot brick below the ignition point. With three or more boilers in the setting, the manifold may be extended so as to give additional outlets facing each firebox. The blanket can be restricted to live boilers by the individual control valves.

The individual valves also afford ready attachment of steam hose for blowing soot or other boiler work.

These hinged sections of sheet-steel platform at cathead side of the drawworks fold back to permit access to skids while loading or blocking up the unit.

5. RIGGING UP

Steel Plates Permit Access to Skids

TO PROVIDE firm footing at the cathead side of the draw works without sacrificing access to skids for moving the unit or blocking it in place, the end sections of the steel standing may be made of steel plates, hinged so as to allow their being folded back when on the move.

The plates completely cover the ends of the skids when down, preventing fouling of catline, hose or other trailing objects. Small cutaway spaces provide for hold-down bolts to fasten draw works to foundation.

Made in a width to permit the hinged section to lie flat on the permanent floor when rigging up or on the move, the floor is not exposed to danger of distortion while being skidded onto a truck or lowered into place, even the hinge pins being covered by the plates while closed.

Pins used to join the hinged and fixed sections of the floor are made to extend the width of the skid frame, so as to eliminate the hazard which otherwise would be presented by the projecting hinges. Welded heads or bent ends retain pins in place when on the move.

HIGHLIGHTS IN THE WEEK'S NEWS

Courts

Supreme Court Upholds State In East Texas Proration Suit

In a sweeping decision holding, in effect, that proration orders of state conservation authorities are beyond the reach of the courts, the United States Supreme Court on June 3 reversed a decision of the Fifth Circuit Court of Appeals holding that a 1938 order of the Texas Railroad Commission was unconstitutionally discriminatory to the interests of Rowan & Nichols Oil Company.

Passing on three oil cases in its final session before summer recess, the court refused to review its decision of May 6 in the Madison oil case and held it had "probable jurisdiction" in the appeal of the Texas Railroad Commission from an injunction against application of its proration orders to the Humble Oil & Refining Company, which was seen as rendered moot by the Rowan & Nichols Oil Company decision.

Humble Oil & Refining Company had secured the injunction on the the ground that as it was owner of 14 percent of the oil in the East Texas field, it should have been permitted to produce 14 percent of the allowable output, instead of 9.932 percent given it under commission orders.

The Rowan & Nichols Oil Company case was brought on the ground that the company was discriminated against in that marginal wells in the East Texas field were given a 20-barrel maximum, while the company's wells were restricted to much less daily production.

The court's opinion, delivered by Associate Justice Frankfurter, held that the federal courts have ground for action in proration cases only where there is a diversity of citizenship or a question is raised whether the action complained of is repugnant to the due process clause of the United States Constitution.

In a dissenting opinion, in which Chief Justice Hughes and Associate Justice McReynolds concurred, Associate Justice Roberts declared the majority "in my judgment, announces principles with respect to the review of administrative action challenged under the due process clause directly contrary to those which have been established."

The majority opinion, strictly limiting the interference of the federal courts in the actions of the conservation authorities, gained added point by reason of the fact that counsel for the commission, in arguing the case, had contended the issue moot, because the commission had changed its procedure since the order was challenged.

"Thorny Problem"

Outlining the contentions of the company that the order complained of would tend to deprive it of oil to which it was entitled and to treat it unfairly in comparison with marginal wells permitted to produce up to 20 barrels a day, Justice Frankfurter commented that "underlying these claims is as thorny a problem as has challenged the ingenuity and wisdom of legislatures."

Because of unsystematized development, the conflict between the theory of ownership of oil in place and that of the rule of capture, and the need for protecting the oil resources of the country, he pointed out, Texas and other states have enacted conservation laws.

"The general scheme of the Texas statute is not challenged," he observed in passing. "Its constitutionality is here settled."

"But merely writing laws is only the beginning of the matter," the opinion continued. "The administration of these laws is full of perplexities. State agencies have encountered innumerable difficulties in trying to adjust the many conflicting interests which grow out of the rule of capture and its implications. The experience of Texas illustrates that a brood of litigation almost inevitably follows the inherent empiricism of these attempted solutions."

These questions, Justice Frankfurter held, are "only episodes in the evolution of adjustment among private interests and in the reconciliation of all these private interests with the underlying public interest in such a vital source of energy for our day as oil," which belong to the commission and not to the judiciary, and except where there is a diversity of citizenship, "the only question open to a federal tribunal is whether the state action complained of has transgressed whatever restrictions the vague contours of the due process clause may place upon the exercise of the state's regulatory power."

The courts, he said, must not substitute their notions of expediency and fairness for those which have guided the agencies to whom the formulation and execution of policy have been entrusted.

"General as these considerations may be," he continued, "they are decisive of the present case. Both the District Court and the Circuit Court of Appeals appear to have been dominated by their own conception of the fairness and reasonableness of the challenged order. For all we know, the judgment of these two lower courts may have been wiser than that of the commission, and their standard of fairness a better one. But whether a system of proration based upon hourly potential is as fair as one based upon estimated recoverable reserves or some other factor or combination of factors, is in itself a question for administrative and not judicial judgment.

Administrative Problem

"According to the commission's experts, theories of allocation urged by the respondent and accepted by the courts below would in fact give to respondent more than its fair share of the oil in the field. Respondent, the commission's witnesses contend, would gain undue benefit from the constant eastward migrations of oil caused by the gradual influence of subsurface pressure gradients—and this at the expense of other lessees in geologically less fortunate portions of the field. The commission's experts further insisted that, though much technical progress has been made, estimates of recoverable reserves beneath the surface of a particular tract remain largely an indeterminate venture; and that hourly potential actually takes into account, at least in some measure, all relevant factors for ascertaining recoverable reserves. Certainly, in a domain of knowledge still shifting and growing, and in a field where judgment is therefore necessarily beset by the necessity of inferences bordering on conjecture, even for those learned in the art, it would be presumptuous for the courts, on the basis of conflicting expert testimony, to deem the view of the administrative tribunal, acting under legislative authority, offensive to the fourteenth amendment."

Equally enmeshed in "a conflict expertise," he went on, is the company's claim that the order, with its allowance to marginal wells, substantially places production on a flat per-well basis, in which the lower courts concurred, but "not only are the individual interests of these small operators involved, but their effect on the state's economy" is a factor to be considered.

"Plainly these are not issues for our arbitrament," the opinion concluded. "The state was confronted with its general problem of proration and with the special relation of it to the small tracts in the particular configuration of the East Texas field. It has chosen to meet these problems through the day-to-day

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exertions of a body specially entrusted with the task because presumably competent to deal with it. In striking the balances that have to be struck with the complication and subtle factors that must enter into such judgments, the commission has observed established procedure. If the history of proration is any guide, the present order is but one more item in a continuous series of adjustments. It is not for the federal courts to supplant the commission's judgment even in the face of convincing proof that a different result would have been better."

East Texas Decision Confuses Austin

Decision in the Rowan & Nichols case created confusion in Austin last week as state officials and oil company attorneys attempted to interpret the majority opinion.

Attorneys opposing the company expressed the opinion that the decision meant there was no need to appeal from Texas Railroad Commission orders, and that "confiscation," so far as proration orders were concerned, no longer exists.

They understand the court to mean that if the commission, after hearing, finds that the per-well method of allocation is best for a field, then that is the law unless the commission chooses to adjust its order later.

On the other hand, attorneys who are employed by clients siding with the complaining company, thought perhaps the decision meant the wrong procedure had been followed.

State attorneys pointed out the court said, "Certainly so far as the federal courts are concerned, the evolution of these (proration) formulas belong to the commission and not to the judiciary."

Major oil company attorneys replied that the court then said: "Except where the jurisdiction rests, as it does not here, on diversity of citizenship, the only question open to a federal tribunal is whether the state action complained of has transgressed whatever restrictions the vague contours of the due process clause may place upon the exercise of the state's regulatory powers . . . "

To Call Hearing

Meanwhile, Commissioner Jerry Sadler said that as soon as a full copy of the opinion was available and had been studied, the commission would call another East Texas hearing to consider revision of the method of allocation in the field. He declined to state which method he would recommend.

Commissioner Lon Smith, however, thought the commission should reinstate the specific order which the Supreme Court upheld, that is, 2.32 percent of the hourly potential of all the wells in the field with a 20-barrel minimum allowance assigned to all of them. Not only would this plan have the support of a Supreme Court decision, but it would do much to allay complaints from operators along the west edge of the field. Although it would do nothing to increase the allowables from their wells, it would materially reduce allocations made to wells in the fairway and to the east, thereby reducing the drainage along the west edge.

Drilling of inside locations in the East Texas field should be accelerated as a result of the decision. Nominal volume of development has been carried on by owners of densely drilled leases after the two lower courts ruled against proration orders that place a premium on close-well spacing.

Currently the field has nine operations, including five drilling tests. A large percentage of the completions made this year involve average density of less than three acres per well. Owners assumed that field rules would not be changed whereby the allowable would be cut below a profitable basis.

Abandoned oil wells have outnumbered new completions since the peak level on completions was reached in August, 1939, with a total of 26,061 wells. A total of 145 plugged oil wells have been listed this year, for an average of about seven per week.

Set Pacific Coast Trusts Trial Date November 19

Federal District Judge Paul J. McCormick has set November 19 as trial date in prosecution of the West Coast oil industry for alleged Sherman anti-trust act violations on which indictments were voted by a special grand jury late in 1939. In view of the volume of evidence to be examined, it is anticipated that trial of the indictments will require at least four months.

Last week 29 companies and two trade associations pleaded not guilty to the charges. Ten other companies had previously entered similar pleas. Those pleading last week had petitioned the court for a bill of particulars, which was denied by Judge McCormick on May 22.

Since it appears that trial work will carry through into late February, 1941, outcome of the government's drive against alleged anti-trust activities of the Pacific Coast oil industry probably will not be known before next spring or early summer.

Companies entering pleas at the hearing last week included 20 members of the Independent Refiners Association, Richfield Oil Corporation, Rio Grande Oil Company, Standard Oil Company of California, The Texas Company, Tide Water Associated Oil Company, Union Oil Company, Seaside Oil Company, Signal Oil & Gas Company, Hancock Oil Company of California and Macmillan Petroleum Company. Associations were the Independent Refiners Association and the Fair Practices Association.

Indictment of the 24 companies and associations involved was obtained following several months of investigation by a special grand jury. In its examination of the case, the United States Department of Justice subpoenaed tons of records from the various companies for presentation to the grand jury. Denial of a bill of particulars asked for by the companies pleading last week was made May 22, after the court held the matter under advisement for several months. It is believed, however, that earlier action on various matters pertaining to the case were held in abeyance pending the United States Supreme Court decision of a week earlier in ruling in favor of the government in the Madison case. The Madison case decision has given new impetus to the government's anti-trust activities in not only the oil industry's affairs, but in other directions as well.

Washington

Industry Representatives Pledge Defense Cooperation

Full cooperation of the American oil industry in all phases of the national defense program was assured Congressional committees last week by representatives of industry associations.

At the same time, however, the industry registered its disapproval of the Johnson bill prohibiting the construction of pipe lines without the authority of the Interstate Commerce Commission.

Representatives of the industry appeared before the House Ways and Means Committee during hearings on the national-defense tax bill to register their acceptance of the proposed increases in the levies on gasoline, lubricating oil and pipe-line transportation, but warned that they would resist the continuance of those taxes when normal conditions are revived.

Presenting their view through the American Petroleum Industries Committee, the various associations accepted the necessity of subordinating their interests to those of the general welfare and indicated that they would meet any demand imposed upon them at this time.

The oil organizations also supported establishment of a national industrial defense corps, as proposed by the Houston Chamber of Commerce, to guard industry from fifth column activities.

Brought to Washington by George A. Hill, president of Houston Oil Company, the proposal was the subject of hearings before the Senate Military Affairs Committee, at which Jesse E. Mosely of Houston, assistant judge advocate of the 36th Division of the Texas National Guard, testified that the board of directors of the American Petroleum Institute have recorded their approval of the project.

Under the plan, workers in all essential industries would organize as a home-defense guard in case of invasion and to ferret out and report to the proper authorities subversive and fifth-column operations which may be attempted in any industry. Representatives of the oil industry expressed approval of the plan, pointing out that theirs is an industry vitally essential to the country in the event of war and one in which every possible step should be taken to guard against disaffection and sabotage.

A different attitude was taken with respect to the bill introduced April 11 by Senator Edwin C. Johnson of Colorado, extending the authority of the Interstate Commerce Commission to the construction of new pipe lines or extension of existing lines.

Industry representatives strongly opposed the measure, particularly in view of the defense situation, pointing out that the necessity of securing the approval of the commission for line construction might entail serious delays which would be harmful to the national welfare as well as the oil industry, particularly in the case of the opening of new fields or pools whose output might be of great importance in effectuating the national defense program.

"One effect of this law would be to

give to existing pipe lines in any field a general monopoly of the pipe line transportation of oil moving from that field until such time as competing companies might be able to obtain from the Interstate Commerce Commission the required certificate of convenience and necessity," it was pointed out by Russell B. Brown in presenting the views of the Independent Petroleum Association.

"Under the definition of necessity, it cannot now be known whether the Interstate Commerce Commission might hold that a second or a third pipe line would be desirable in a field served by one or two pipe line companies. This would create a condition of uncertainty among producers of petroleum who might hesitate to develop some field in which a single pipe line company had a monopoly as the only purchaser since no additional purchasers would be admitted to the field without the Interstate Commerce Commission certificate."

Development of the national defense program, Brown pointed out, will probably place upon existing transportation facilities other than pipe lines, greater burdens than they have been called upon to bear in recent years, and if the oil industry is compelled to rely upon rail facilities for transportation of oil from new fields or pools, the railroads might find themselves unable to meet the emergency while at the same time the increased transportation costs would be reflected in higher prices to consumers.

Study of Oil Transportation Facilities for Emergency

Exhaustive studies to determine the sufficiency of reserves of both crude oil and refined gasoline and the adequacy of transportation facilities, including tankers, tank cars and pipe lines, are being made by the United States Interior Department, it was disclosed June 6 by Secretary Harold L. Ickes.

Discussing the work of the department in connection with the national defense program, Ickes said it has not yet been felt necessary to call executives of any of the oil companies to Washington for consultation but that, if their counsel and advice is needed, the administration will have no hesitancy in inviting their assistance.

He explained that the studies now being conducted are for the purpose of assuring that there are adequate supplies and means for their transportation in the event of an emergency.

The surveys will determine whether the supply of crude oil and of refined products, including aviation as well as regular gasoline, is adequate, and whether there are sufficient tankers, tank cars and pipe lines or other carriers for delivery of crude oil to refineries, or refined products to the Eastern seaboard or elsewhere in whatever quantities may be needed.

Ickes indicated that the reserves of both crude and refined oil are felt to be adequate and that the studies are most concerned with the problems of transportation involved in the delivery of crude oil from the Mid-Continent fields to the Eastern seaboard refineries and the movement of gasoline from the Mid-Continent and Gulf Coast refineries to other parts of the country.

Department officials are not contemplating the suggestion of any legislation on the matter, he said, expressing the belief that whatever adjustment or improvement in facilities may be necessary can be effected without additional laws.

Order Wage Records May Be Kept at Central Office

Oil companies whose operations at various points are directed from their main office were last week given relief from requirements of the Fair Labor Standards Act, under new regulations permitting the maintenance of the required records at a central record-keeping office on condition that such records shall be produced at the place of employment of any employe within 72 hours following notice from a wage-hour inspector.

The new regulations were promulgated to meet objections raised by some employers to the former requirement that where records are maintained at a central office, certain abbreviated records shall be kept at the place of employment.

The modification is in line with Administrator Fleming's policy of easing technical requirements wherever it can be done without jeopardizing the rights of employes or unreasonably increasing or delaying the work of the wage-hour division.

It was pointed out that the new order applies only to the records which must be kept under the Federal act, and that no requirements by the states as to record-keeping under state laws would be affected.

Phillips Petroleum Ordered To Disorganize Union

Disestablishment by Phillips Petroleum Company of "Employee Representatives" at its Denoya plant at Shidler, Oklahoma; abandonment of an agreement with that organization; reinstatement of four employes, with back pay for three, and reimbursement of a fifth employe for certain expenses, was ordered last week by the National Labor Relations Board.

The board, acting on a complaint of the Oil Workers International Union (CIO), also ordered the company to cease discouraging membership in that organization.

The company, conceding that it had sponsored, organized and promoted the employe representation plan, contended that it had not functioned after the enactment of the National Labor Relations Act, but the board refused to agree that such was the fact.

To Extend Kansas Crude Line

The Co-operative Pipeline Association will extend its crude line from its present terminus at the Burnett pool, Northern Ellis County, Kansas, to the Marshall and Walters pools, in the same county. The company will connect leases of the Lario Oil & Gas Company and The Carter Oil Company to increase the crude supply for its refinery at Phillipsburg, Phillips County, Kansas. The company purchased 89,000 barrels of crude oil in April, and its plant has a daily capacity of 3000 barrels.

War in Europe

New Rumanian Appointment Unfavorable to Allies

Any consolation Allied forces may have drawn from belief that Rumanian wells could be sabotaged in the face of a German invasion received a blow last week with appointment of Ion Gigurtu, pro-Nazi and former minister of communications, as foreign minister. He replaced Grigore Gafencu, an ardent protagonist of the Allied cause whose resignation was thought in diplomatic circles to be due to Germany pressure.

Guarding of Rumania's oil wells was taken out of the hands of the British and French oil companies by a decree of the new minister of defense. The order required foreign-controlled companies to fire their own guards and hire Rumanian citizens. Foreigners control about 70 percent of Rumanian production.

A Bucharest press dispatch states all foreigners found in important refining, shipping and transportation centers are to be sent to concentration camps. Later news probably will reveal this will not apply to those who can satisfy the government as to their political and moral qualifications.

Meanwhile, word from Bucharest is that Rumanian petroleum exports during the first quarter of the year were only 825,385 tons, as compared with 1,130,757 tons in the first quarter of 1939, whereas this year's sales brought almost twice as much money.

When figures for distribution of the third quarter exports are available, it will be interesting to compare them with those showing distribution of exports for the first quarter. Distribution of first quarter exports of this year, compared with those of the same period of 1939, follows:

Rumanian Exports To:	Tons 1940 First Quarter	1939
Great Britian and colonies	325,556	225,896
Italy	23,967	172,353
Hungary	3,436	46,362
Turkey	57,781	8,229
Germany	75,254	182,790
Bohemia-Moravia and Slovakia	34,827	81,438

A glance at the above table illustrates that Britain was the greatest taker of Rumanian petroleum during the first quarter, and that Turkey got seven times as much oil in the first quarter of 1940 than she did in the first quarter of 1939. It is interesting to note that deliveries to Germany and Italy were down substantially, as were those to the German protectorate of Moravia-Bohemia and Slovakia.

German takings in the first quarter of 1940, which consisted of 14,455 tons in January, 20,291 tons in February, and 36,508 tons in March to make up a total of 75,254 tons, were slowed partly by transportation difficulties. Germany's quota of oil for the first three months of the year is supposed to have been 570,000 tons, or over seven times the amount she actually got. This may have had something to do with a statement recently attributed to Valentin Garfias, of Cities Service Oil Company, to the effect that Germany must win the war by the end of the year or suffer from shortage of fuel.

Illinois-Indiana Meet Draws Six Hundred Oil Men

MORE than 600 oil men, some from Southwest and Eastern fields, attended the eighth annual petroleum conference of the Illinois-Indiana Petroleum Association in Robinson, Illinois, on June 1.

Neal Nyland, advertising manager for Plymouth Motor Corporation, speaking at the evening banquet session, described the petroleum and automobile industries as "partners."

"By combining our products, we actually sell transportation—for the most part, individual transportation," he said. And the number of autos we sell, as well as the amount of gasoline sold in direct consequence, depends on how well and how economically we do our individual jobs.

"Improvements in efficiency of the motor car and improvements in quality of fuel always go hand in hand," he added. "Recent developments in the petroleum industry therefore open up exciting vistas for the not too distant future. What this may mean in increased sales for both of us is suggested by the fact that gasoline consumption has increased more than three times in the last 15 years."

Abstracts of some of the papers presented follow:

Stabilization Through Proper Well Spacing

By Don R. Knowlton
Phillips Petroleum Company, Bartlesville, Okla.

Reduction of developing and operating costs offers the best possibilities for improving the producer's position. Costs can be reduced, legally and in good faith, by developing reserves with less capital expenditure through wider spacing of wells and unit operation of pools.

Unitization and some of the operating practices which it makes possible merit careful consideration. The refusal of some operators to participate in unit projects has been used by the proponents of the Cole bill, seeking federal control of the industry, to make powerful medicine.

No problem is the source of all the industry's ills. Just which is the most pressing problem is difficult to say, but the problem of unnecessary wells ranks near the top. The problem will be solved either by the laws of economics and the Cole bill, or by careful, intelligent planning of the industry itself.

Markets for Illinois Oil in 1939 and 1940

By Walter H. Voskuil
Illinois State Geological Survey, Urbana, Illinois.

Production of 425,000 barrels of oil daily in the Illinois district, which three years ago was producing about 12,000 barrels a day, an increase at a ratio of 35 to 1, has materially altered market relationships among existing producing districts and principal refinery centers. Illinois oil flows into four refining districts, Central, comprising Illinois, Indiana, Kentucky, western Ohio and Michigan; refineries in eastern Ohio and Buffalo, New York; Atlantic Seaboard refineries, and Canada.

Pipe lines from the Illinois fields provide an outlet for approximately 180,000 barrels daily to refineries in the Chicago and St. Louis districts. For refineries in central and eastern Illinois, the transportation factor is not critical; existing refining capacity has been provided with pipe-line facilities from the fields, or loading stations on railroads in the fields. Ohio refineries take an estimated 90,000 barrels, with an additional estimated 15,000 barrels going to Buffalo and 3000 barrels to Detroit. A sharp rise in ocean tanker rates within recent months has resulted in movement of about 20,000 barrels daily to the eastern seaboard.

Electrical Logging While Drilling

By David G. Hawthorn
Amerada Petroleum Corporation, Tulsa, Oklahoma.

The subject was described as a mechanical development, accomplished after more than five years were spent in designing, developing and proving a special rotary drill stem and auxiliary electrical and recording apparatus by which a well may be drilled and the electrical log simultaneously secured.

The drilling bit, so insulated that it may function as an electrode, is electrically connected to recording apparatus on the surface by means of an insulated electric conductor integrally incorporated in the drill stem. While actual drilling is in progress, electrical measurements of the formation in the immediate proximity of the bit are instantly and continuously recorded on charts clearly visible to an operator. This record provides means for immediate correlation and diagnosis of the stratum being drilled, thus furnishing a guide to the drilling and coring of an exploratory well.

Six wells, for a total of 27,267 feet of hole, have been drilled and logged by this method in the past six years. Logs were almost identical to those taken by the conventional electric method.

Electrification of Oil Field Properties

By Orville Dowzer
The Dowzer Construction Company, Salem, Illinois.

There are two methods by which an operating company may obtain electric power, by installation of private generating stations, or by purchase from an electric service company operating in the area. The choice between the two methods or sources is based upon economic considerations, location of the property to be served and continuity of service desired.

Cost of installations or cost of power when purchased from a private utility cannot be given as there are too many variables and unknown quantities that determine such costs. Each installation is an individual problem, and as for charges by utility companies, rate structures are complex and vary with the community or locality so as to make a discussion of them meaningless.

From the purely economical side, purchased power for long-term operation should prove to be the most desirable method for the producing company. This, of course, depends upon establishment of equitable rates and low demand charges. By using purchased power, the oil operator is placing responsibility for delivery of service directly on the seller, whose principal line of business is sale of electrical energy.

Taxation of Oil Properties in Illinois and Indiana

By H. G. Chase
The Pure Oil Company, Chicago, Illinois.

The valuation of producing leases presents many perplexing questions, and in the case of development of new territory the assessors are without knowledge as to the best method of arriving at a value. Even the opinion of geologists and production engineers as to the value of a new field may be tentative and uncertain. One method for arriving at an assessed valuation for producing properties takes into account the thickness of producing stratum, its porosity, gas pressure and other factors which the assessing officials would ordinarily find too complicated for practical application.

The plan generally adopted in new Illinois fields, in the face of a law classifying oil leases as real estate, provides a sliding scale of assessed values for producing properties of $100 per barrel for the first year of production, $200 for the second year, $300 for the third year, $400 for the fourth year, and so on. While the plan, adopted in most counties, has worked out fairly well, it would be somewhat high if a proration law were enacted.

There has been some agitation for a production tax in Illinois. As this would simply lay an additional burden on an already over-taxed industry, it is felt that such a tax would be extremely inequitable.

In Indiana, a committee consisting of the State Board of Tax Commissioners and county assessors has recommended that producing wells be assessed at 365 times daily average production multiplied by the price of oil on March 1, using 25 percent of the figure obtained for first year production, 50 percent for the second year, 75 percent for the third year, and 100 percent for the fourth year and thereafter.

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MEN IN THE INDUSTRY'S NEWS

IRVIN ALEXANDER, district superintendent for The Carter Oil Company in the Seminole area, has been awarded a 20-year service pin. Others receiving the award included James F. Lancaster, pumper, and E. M. Cruise, Seminole; James B. Pearce, roustabout, Healdton production district; C. E. Carse, repairman-helper, Grisso gasoline plant; Pryor A. Hamilton, core-drill helper, eastern exploration; Eber E. Baird, pumper, St. Elmo, Illinois. Ten-year pins were awarded to O. A. Seager, division geologist in Montana; D. C. Harrell, division geologist at Jackson, Mississippi; Hugh Maguire, district clerk, Oklahoma City, and James L. Smith, core-drill helper, eastern exploration area.

EDWIN B. HOPKINS, vice president and general manager of the American Maracaibo Company, Dallas, won the golf tournament held at Fort Worth in connection with the mid-year meeting of the American Petroleum Institute. He shot a gross 84, with a handicap of 18, for a winning score of 66, thereby attaining a leg on the J. Edgar Pew trophy, which must be won three times for permanent possession. J. Earle Brown, Fort Worth geologist and engineer, was runnerup with a net score of 68.

PHIL K. COCKRAN, district geologist for The Carter Oil Company in Kansas, resigned that position June 1 to become chief geologist of Standard Oil Company of Louisiana. Cockran succeeds W. S. Link, who has been transferred to the New York offices of the Standard Oil Company of New Jersey. W. L. Cline is acting district geologist in Kansas until a permanent successor is named.

FRED J. PLATTNER has been appointed general superintendent of all terminals for General American Tank Storage Terminal Division of General American Transportation Corporation, succeeding the late William J. Besselman. Plattner has for several years been superintendent of the company's terminal at Carteret, New Jersey. He will have his headquarters in New Orleans.

JOE E. BUTLER, East Texas producer and a resident of Corsicana, Texas, is attending the annual convention of Rotary International being held June 9-13 at Havana, Cuba, serving as vice chairman of the oil industry craft.

J. H. LANCASTER, 48, Fort Worth district superintendent of telephone and telegraph operations of Gulf Oil Corporation, died of a heart attack May 30. He had been with the company 22 years.

ROBERT H. FOSTER, executive vice president of Landreth Production Corporation, has been elected president of the Texas Christian University board of trustees. He is a graduate of the school.

L. C. STEVENS, Warwickshire County, England, and J. J. Cardynaals, The Hague, Holland, both with Royal Dutch Shell Oil Company, were visiting in the Mid-Continent oil fields last week Stevens has been in the Maracaibo basin of Venezuela for the past 4 years, and before that he was at Trinidad. Cardynaals has spent the past 10 years in South Sumatra, Dutch East Indies.

Z. MATSUMURA, president, and I. Tanako, of Maruzen Oil Company, Osaka, and Hideo Kawamure, department of commerce and industry of the Japanese government, Tokyo, visited Tulsa and Ponco City last week as guests of Neil C. Potter, New York petroleum broker. Acting as guides and interpreters during their trip through the United States are I. Terao, Mitsubishi Steamship Company, San Francisco, and K. Murayama, Azano Bussan Company, New York. The Nipponese left for a tour of the Gulf Coast area and the Atlantic Seaboard to New York before returning to Japan.

PAT M. BROACH, Kansas scout for Stanolind Oil & Gas Company, has been transferred to Houston. W. L. McGee, who had been in the Oklahoma City area, succeeds Broach at Wichita.

WILLIAM L. RUSSELL, geologist for Michigan Devonian Petroleum Company, has been transferred from Macomb, Illinois, to Tulsa.

H. I. JOHNSON, production superintendent for Bistate Oil Company, has transferred to Ferdig from Oilmont, Montana.

C. J. BRADLEY, scout for The Texas Company at Tyler, Texas, was elected president of the National Oil Scouts & Land Men's Association at the closing session of its annual convention held in Hot Springs, Arkansas, June 1.

Other officers elected were H. L. Eversberg, Baton Rouge, first vice president; R. H. Weaver, Jackson, Mississippi, second vice president; R. L. Denton, Kilgore, secretary-treasurer, and W. E. Tracy, Bridgport, Illinois, editor of the association magazine.

C. J. BRADLEY

ELTON STERRETT and WILLIAM G. NORTH, JR., last week joined the editorial staff of The Oil Weekly. Sterrett, a graduate engineer of Purdue University, class of 1913, has been assistant chief engineer for Arkansas Pipe Line Corporation at its Coster station near Greggton, Texas. He has contributed articles to a number of technical journals, including The Oil Weekly and Refiner and Natural Gasoline Manufacturer. North is a recent graduate of Agricultural and Mechanical College of Texas with a bachelor's degree in Petroleum Engineering. Both will work from the Houston office.

R. E. BRIGHAM, district land man for Cities Service Oil Company, has been transferred from Wichita to Mount Pleasant, Michigan. Paul Schaefer goes from Mount Pleasant to Odessa, Texas. John Maddox, also district land man, is being transferred from Odessa to Amarillo. Z. T. Hodehan, land man at Amarillo, will replace Brigham at the Wichita office.

W. E. SIMPSON, of Socony-Vacuum Oil Company's marine department at New York, has been named to the American Petroleum Institute's central committee on tanker and barge transportation of petroleum.

W. M. COGEN, Shell Oil Company, discussed "Comparison of Heavy Mineral Zones with Faunal Horizons in Louisiana Gulf Coast Cenozoic Sediments" before the Houston Geological Society last week.

Nineteen File for Texas Commission Nomination

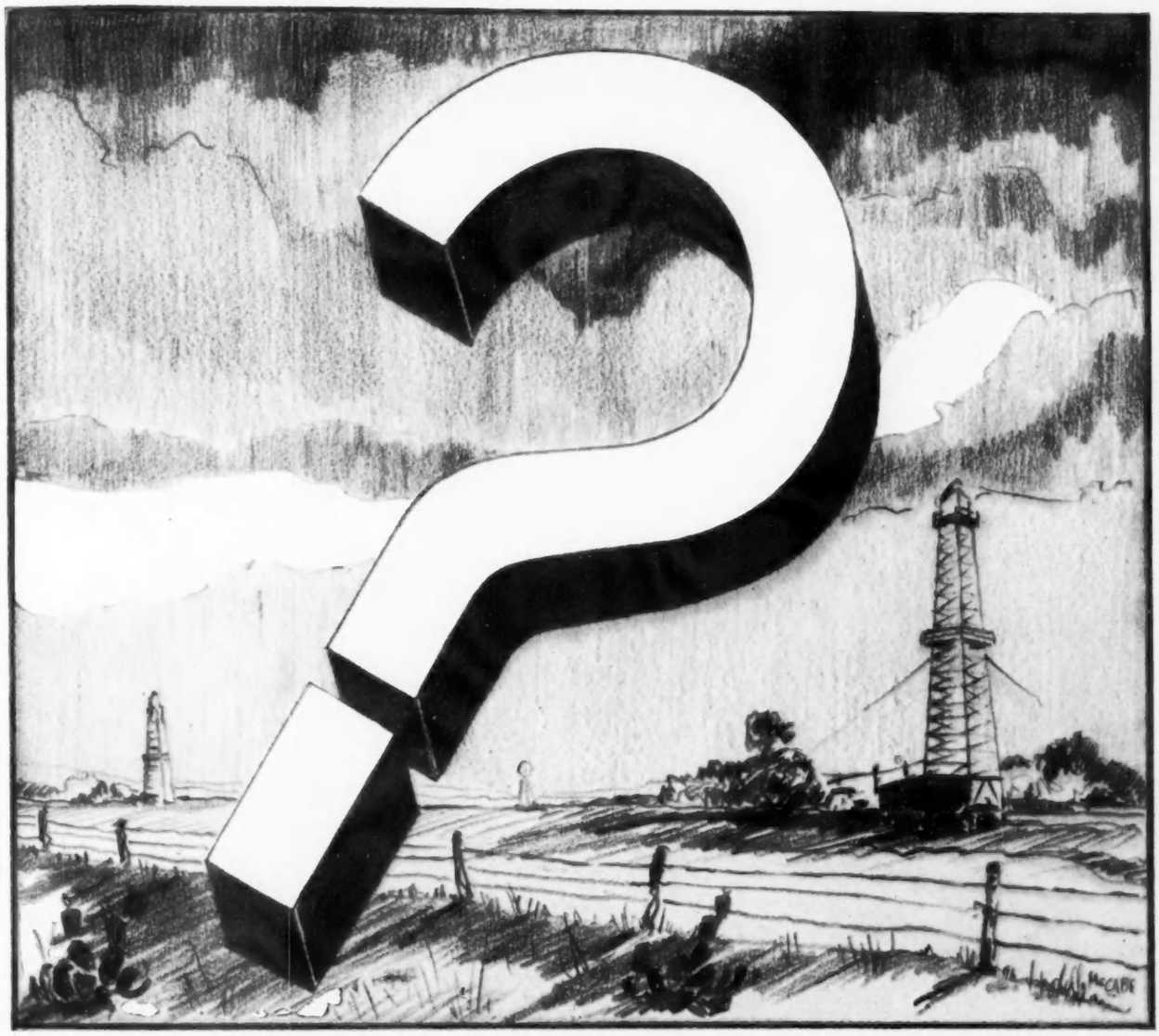
Nineteen candidates for Texas Railroad Commissioner will appear on the Democratic party primary ballot. They are:

Eugene T. Smith, Austin; Errol Holt, Dallas; W. H. McDonald, Austin; Walton D. Hood, Austin; Bryan Patterson, Alice; Clyde E. Smith, Woodville; John Paul Jones, New London; Charlie Langford, Jr., League City; Olan R. Van Zandt, Tioga; Olin Culberson, Edna; Baker Saulsbury, Amarillo; Pierce Brooks, Dallas; Ross Hardin, Prairie Hill; John Pundt, Dallas; John D. Copeland, Austin; O. O. Terrell, Alvin; Larry Mills, Dallas; C. A. Everts, Dallas, and Bailey Sheppard, Longview.

Shreveport Geologists To Reprint Guide Book

Weldon E. Cartwright, secretary of the Shreveport Geological Society, last week announced plans of the group to reprint its guide book on "Upper and Lower Cretaceous of Southwest Arkansas," first published in June, 1939, in conjunction with the society's fourteenth annual field trip.

Decision to reprint followed receipt of an order for 50 copies by members of the Mississippi Geological Society, and was also governed by 100 orders that went unfilled after the original printing of 700 copies was exhausted. The original price of $3 a copy will be maintained.



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Large Refinery Runs Hold Gasoline Stocks High

Increased refinery runs and failure to reduce burdensome gasoline stocks despite lower production of that product were unfavorable features of the latest statistics of the industry, covering the week ended June 1. On the other hand, there were several desirable developments, including a decrease in crude oil production and a needed large addition to heating oil stocks.

United States crude oil production declined 86,600 barrels daily, as Texas registered a sharp drop because of the one-a-month shutdown of all fields of the state on June 1. The national output still was, however, about 150,000 barrels a day in excess of market demand, having averaged 3,749,050 barrels daily, the American Petroleum Institute reported. The wells were putting out 5.4 percent more crude than in the corresponding week last year.

Crude runs to stills were stepped up sharply from 3,580,000 to 3,650,000 barrels daily and then were within 15,000 barrels of the all-time peak that was reached a few weeks ago. The runs were 6.6 percent greater than the daily average of May and June last year.

Production of gasoline did not reflect immediately the stepping up of refinery runs, having been 295,000 barrels smaller in the week of June 1 than in the previous week, in totaling 11,793,000 barrels for the new seven-day period.

Despite the smaller production of gasoline, the stocks of that product failed to show a decline, which would have been normal for this time of year. Instead, 56,000 barrels went into storage, which rose back to 100,353,000 barrels. That quantity compared with only 84,070,000 barrels on hand a year previously. The gain of 16,000,000 barrels, or nearly 20 percent, over the stocks of a year ago is largely surplus gasoline, as the stocks of last year would have sufficed for meeting the current slightly enlarged demand.

Heating Oils Accumulate

In its efforts to build up heating oil stocks in preparation for the heavy demand of next winter, the industry obtained good results in the week ended June 1. Storage of gas/oil and distillate fuel was increased 1,177,000 barrels during the week to a total of 29,533,000 barrels, and then stood 5.7 percent above the corresponding level a year ago. Until a few weeks ago the stocks were below the 1939 trend.

Heavy fuel oils also were added to storage, the total supplies of residual fuel oils in the United States having increased to 104,768,000 barrels, a gain of 753,000 barrels for the week. The inventory of the heavy fuel oils is, however, about 6 percent smaller than at this time last year, while demand has increased.

Stocks of crude oil again increased in the week ended May 25, latest period for which Bureau of Mines figures are available. They rose from 257,647,000 to 259,330,000 barrels, a gain of 1,683,000 barrels, as crude runs to stills were temporarily lower while crude production remained large. The present crude oil inventory is about 19,000,000 barrels, or 7 percent, smaller, nevertheless, than that held a year ago.

Unsettled Markets Reflect Conflicting Influences

The markets still were characterized last week by the unsteadiness and uncertainty of the week before, in reflection of various unfavorable conditions in the industry.

Markets for crude oil are bolstered on one hand by improved control of production this month, but on the other hand they are in danger of being pulled downward by the present depressed prices of gasoline.

Crude Oil Markets

Particularly endangered are the crude price postings in California, in view of the recent sharp break in retail gasoline prices throughout the Pacific Coast region. For it is recognized that refiners may not be able to continue paying the established prices for crude unless the former gasoline prices are wholly or largely restored.

It has been in the Mid-Continent, primarily, that crude production has been excessive in recent months; and that region will benefit from the stricter allowables scheduled for June.

Illinois heretofore has been producing more crude oil than firm demand has justified, and the market has reflected the overproduction. But markets have steadily expanded with enlargement of pipe line facilities, while development of flush production has lagged, with the result that the Illinois crude market gradually has been gaining strength.

Unsteadiness still prevails in the crude market of the Appalachian region, despite the recent reduction of 25 cents a barrel in prices of Pennsylvania grade crude. For it is considered possible that an additional reduction ultimately may be made, unless prices of lubricants regain some of the ground lost since the beginning of this year.

Across the continent, in the Rocky Mountain region, there was evidence last week of an improved market for crude, as an independent purchasing company raised its price for Kevin crude from 80 to 90 cents a barrel, that is, to the higher price that major purchasers have been paying.

Refined Oils

Prices for refined products last week were largely the same as in the preceding week, although there was some further marking down of quotations on kerosene and light fuel oils on the Atlantic Coast and on lubricants in the Mid-Continent refining districts.

In the North and the Middle West it was reported last week that demand for gasoline had improved, because of better weather. Consequently, there were increases in movements against contracts.

Heavy fuel oils also have been in greater demand lately. The increased demand is believed to reflect anticipation of a general stepping up of industrial activity in consequence of the national defense program.

The markets for kerosene and light fuel oils reflect further dropping off of orders. A few weeks ago, some refiners were buying kerosene to supplement their own production, in meeting spring needs on the

PRODUCT PRICES

REFINED GASOLINE

	Range Last Week (Cents a gal.)		Changes from week Before	
Oklahoma Refineries:				
60 Octane and under	4	4¼	...	...
63-66 Octane	4¼	4⅜	...	...
72-74 Octane	4⅜	5¼	...	...
Mid-Western Tank Car:				
60 Octane and under	4	4¼	...	...
63-66 Octane	4⅜	4⅜	...	...
72-74 Octane	4⅜	5¼	...	...
New York Harbor:				
70 Octane and under	6¼	6¼	...	...
72-74 Octane	6¼	6¾	...	...

NATURAL GASOLINE

Grade 26-70:				
F.O.B. Group 3	1½	1½	...	...
F.O.B. Breckenridge, Texas	1¼	1¼	...	...

KEROSENE

Oklahoma Refineries:				
41-43 water white	4	4¼	...	...
42-44 water white	4⅛	4⅝	...	...
Mid-Western Tank Car:				
41-43 water white	4	4¼	...	...
42-44 water white	4⅛	4⅝	...	...
New York Harbor	5½	—6	—½	...

RANGE OIL

At Oklahoma Refineries	3⅝	3⅞	...	...
In Mid-Western Market, Group 3 basis	3⅝	3⅞	...	...

LIGHT FUEL OILS

Oklahoma Refineries:				
No. 1 straw	3⅜	3⅝	...	...
No. 3	3¼	3⅜	...	...
Mid-Western Tank Car:				
No. 1 straw	3½	3⅝	...	...
No. 3	3⅛	3⅜	...	...
New York Harbor:				
No. 1	5½	—6	—½	...
No. 3	4¾	5½	...	...

HEAVY FUEL OILS

(Per Barrel)

	Range Last Week (Cents a gal.)		Changes from week Before	
Oklahoma Refineries:				
No. 6	50	55	...	...
Mid-Western Tank Car:				
No. 5	75	75	...	...
No. 6	45	55	...	...
New York Harbor:				
No. 5	$1.70	$1.85	...	...
No. 6	1.35	1.50	...	...

BUNKER C FUEL OIL

(Per barrel, ships bunkers)

Gulf Coast	$ .80	$ .95	...	...
New York Harbor	1.35	1.50	...	...

DIESEL OIL

(Per barrel, ships bunkers)

Gulf Coast	$1.50	$1.70	...	...
New York Harbor	1.95	2.20	...	...
Los Angeles Basin, 27 gravity	1.15	1.40	...	...

LUBRICATING OIL

Oklahoma Refineries:				
Bright stock, 150-160 viscosity at 210°, 10-25 pour test	17	21	—½	+½
Neutral oil, pale, No. 3 color, 150 viscosity at 100°, 0-10 pour test	9½	11¾	—1	...
Western Pennsylvania:				
Bright stock, 145-155 viscosity, at 210°, 25 pour test	19	20	...	...
Neutral Oil, No. 3 color, 150 viscosity, at 70°, 25 pour test	20	20	...	...

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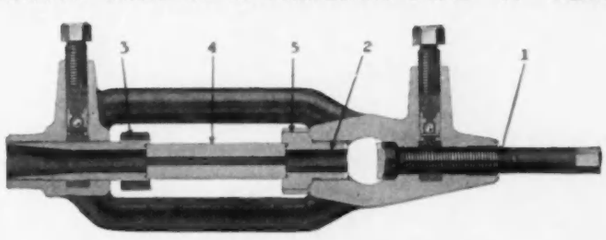
CROSS-SECTION VIEW OF A CAMERON TYPE "A" FLOW WING



The cross-section drawing herewith clearly illustrates the simplified design and construction of this unique Flow Wing. When it is desired to change the flow bean, a wrench is fitted to the valve stem (1) and the valve is closed against the seat (2). Two turns on the clamp screw (3) releases the flow bean (4). After replacing the flow bean, the above procedure is reversed and the well is back on production. The locking ring (5) maintains a tight metal-to-metal joint between the shoulder on the valve seat and the body, thus preventing leakage at this point.

Flow Beans are 6" long. Both the valve stem and valve seat are faced with hard metal to resist cutting. Note that the downstream end of the clamp screw is belled to reduce turbulence and cutting. Note, also, that the valve stem and the clamp screw are packed with plastic packing which may be replenished under pressure. Furnished with screwed, screwed by flanged, or all flanged connections.

Complete details on the design and operation of the Cameron Type "A" Flow Wing will gladly be furnished on request.

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Trends of United States Production and Stocks

Figures are from American Petroleum Institute weekly reports, except those on crude stocks, which are from Bureau of Mines weekly reports

WEEK ENDED	Crude Oil Production (Barrels Daily)	Crude Runs to Stills (Barrels Daily)	Crude Oil Stocks (Barrels)	Gasoline Stocks (Barrels)	FUEL OIL STOCKS	
					Gas Oil & Dist. Fuels	Residual Fuel Oil
1937:						
August 28	[5]3,731,450	3,425,000	309,506,000	66,997,000	112,111,000	
September 25	3,666,300	[5]3,455,000	307,974,000	65,620,000	116,472,000	
1938:						
March 19	[1] 3,433,550	3,080,000	306,380,000	[5]93,192,000	122,067,000	
November 12	3,243,250	3,180,000	273,394,000	[6]67,551,000	34,175,000	120,491,000
December 10	3,245,100	3,150,000	[6]269,509,000	68,687,000	32,068,000	118,711,000
December 31	3,201,450	3,115,000	273,024,000	71,695,000	29,082,000	115,741,000
1939:						
January 28	3,248,250	3,235,000	271,763,000	77,279,000	26,583,000	112,766,000
February 25	3,328,850	3,185,000	271,758,000	84,597,000	23,419,000	110,252,000
March 25	3,382,350	3,225,000	273,915,000	87,561,000	21,487,000	107,551,000
April 22	3,526,700	3,280,000	277,156,000	[2]87,769,000	21,085,000	105,035,000
April 29	3,568,200	3,405,000	278,440,000	86,794,000	[7]25,844,000	[7]108,409,000
May 6	3,580,900	3,275,000	[2]278,607,000	86,216,000	26,167,000	108,597,000
May 27	3,585,250	3,405,000	278,289,000	84,152,000	26,992,000	109,386,000
June 24	3,452,800	3,430,000	272,297,000	81,733,000	30,239,000	111,726,000
July 29	3,539,100	3,460,000	268,513,000	77,887,000	34,900,000	114,053,000
August 5	[3]3,909,400	3,445,000	268,982,000	76,431,000	35,601,000	114,512,000
August 26	[2]1,690,800	3,475,000	246,982,000	73,475,000	37,722,000	116,237,000
September 30	3,658,200	3,560,000	233,023,000	71,168,000	38,081,000	115,466,000
October 7	3,435,850	3,505,000	231,564,000	[6]71,152,000	38,549,000	114,397,000
October 21	3,771,550	[3]3,650,000	[3]229,127,000	72,122,000	39,358,000	115,060,000
October 28	3,498,500	3,520,000	230,453,000	72,660,000	39,562,000	114,786,000
November 25	3,818,100	3,510,000	231,811,000	75,595,000	38,527,000	112,106,000
December 30	3,545,000	3,445,000	237,742,000	80,985,000	34,184,000	106,680,000
1940:						
January 27	3,611,600	3,470,000	237,339,000	87,914,000	27,407,000	103,015,000
February 24	3,732,100	3,490,000	240,836,000	96,719,000	25,390,000	103,419,000
March 30	3,841,250	3,585,000	250,561,000	101,370,000	23,778,000	105,081,000
April 20	3,858,550	3,535,000	254,881,000	[1]102,817,000	24,779,000	103,323,000
April 27	3,845,250	3,555,000	256,670,000	102,452,000	24,997,000	102,552,000
May 4	3,679,050	3,505,000	258,210,000	102,063,000	25,658,000	103,043,000
May 11	3,825,450	3,620,000	257,079,000	101,317,000	26,552,000	103,985,000
May 18	3,835,100	[3]3,665,000	257,647,000	101,015,000	27,345,000	104,245,000
May 25	3,835,650	3,580,000	259,330,000	100,297,000	28,356,000	104,015,000
June 1, 1940	3,749,050	3,650,000	.....	100,353,000	29,533,000	104,768,000
June 3, 1939	3,558,800	[8]3,423,000	[4]278,289,000	84,070,000	27,949,000	111,282,000
Change in past year	+5.4%	+6.6%	—6.8%	+19.4%	+5.7%	—5.9%

[1] All time peak. [2] Peak for 1939. [3] Lowest since April, 1922. [4] Stocks, May 20, 1939. [5] Peak prior to 1939. [6] Lowest for year. [7] Prior to April 29, 1939, data did not include stocks at terminals, in transit, etc., except in California. [8] May-June, 1939, daily average. [9] Lowest since October, 1922, due to the shutdown of six Mid-Continent States.

farms; but such purchasing has diminished. Meanwhile, purchases of light fuel oils have been curtailed seasonally.

Lubricants have continued in relatively light demand, as export business has further lagged, while domestic requirements have not shown any material pick-up. Consequently, some Mid-Continent refiners last week further marked down their quotations 1 cent a gallon on both bright stcoks and neutral oils. Similarly, bright stocks and some grades of neutrals were lowered 1 cent a gallon by refiners in Western Pennsylvania. In both the mentioned districts, refiners complained that domestic business was good but that larger exports were needed to steady the markets.

California Gasoline Price Cutting Believed Temporary

While liberal concessions below the reduced gasoline price postings established in the Los Angeles area May 28 have been observed in some sections, consensus is that following a period of readjustment, prices will be stabilized at the levels set on that date. The new prices are 14½ cents for third grade, 16½ cents for second grade, and 18½ cents for premium grade fuels.

Some quotations offering gasoline at prices ranging to 3½ cents below the new levels are believed to represent closing-out operations of independent refining units retiring from the field temporarily. Such operations are expected to provide a disquieting factor in the Los Angeles area until their inventories have been liquidated. Most independent retail outlets, however, are keeping daily inventories at a minimum, as a hedge against further price reductions.

United States Crude Oil Production

Estimates Compiled by THE OIL WEEKLY

DISTRICT OR STATE	Bureau of Mines Estimate of Daily Demand in June	State Allowable in June	BARRELS DAILY FOR WEEK ENDED June 1	June 8
TEXAS—				
Texas Panhandle	.....	.....	67,600	68,200
North Texas	.....	.....	104,500	112,100
West Central Texas	.....	.....	32,500	33,900
West Texas	.....	.....	237,200	238,200
East Central Texas	.....	.....	78,800	82,100
East Texas Field	.....	.....	298,500‡	396,600
South Texas	.....	.....	220,400	237,300
Texas Gulf Coast	.....	.....	229,300	227,800
Total Texas	1,344,600	1,335,530*	1,268,800‡	1,396,200
CALIFORNIA—				
Long Beach	.....	.....	42,500	45,800
Midway-Sunset	.....	.....	45,900	64,400
Kettleman Hills	.....	.....	46,200	44,000
Wilmington	.....	.....	84,400	83,700
Others	.....	.....	385,600	386,900
Total California	593,700	592,000†	604,600	624,800
OKLAHOMA—				
Oklahoma City	.....	.....	97,850	113,950
Seminole Area	.....	.....	103,350	105,100
Others	.....	.....	217,050	218,050
Total Oklahoma	408,600	408,100	418,250	437,100
ILLINOIS—				
Salem	.....	.....	239,400	249,200
Louden	.....	.....	76,100	75,250
Other New Pools	.....	.....	110,050	123,150
Old Pools	.....	.....	9,750	10,600
Total Illinois	395,600	.....	435,300	458,200

DISTRICT OR STATE	Bureau of Mines Estimate of Daily Demand in June	State Allowable in June	BARRELS DAILY FOR WEEK ENDED June 1	June 8
LOUISIANA—				
North Louisiana	.....	.....	70,100	69,900
South Louisiana	.....	.....	238,200	223,200
Total Louisiana	274,700	278,566	308,300	293,100
KANSAS	159,000	159,000	158,850	150,950
NEW MEXICO	106,700	106,700	107,100	106,800
EASTERN STATES—				
Pennsylvania Grade	49,400	.....	76,100	78,600
Others, Eastern	49,000	.....	19,500	19,500
Total Eastern States	98,400	.....	95,600	98,100
MOUNTAIN STATES—				
Wyoming	73,000	.....	68,500	71,800
Montana	18,300	.....	17,500	17,800
Colorado	4,000	.....	3,300	3,300
Total Mountain States	95,300	.....	89,300	92,900
MICHIGAN	62,000	56,000	59,500	59,200
ARKANSAS	66,700	70,515	71,500	72,400
INDIANA	8,000	.....	12,800	12,100
MISSISSIPPI	7,000	.....	9,350	9,250
NEBRASKA	.....	.....	150	220
‡Total 8 Prorated States	3,016,000	3,006,411	2,990,900‡	3,140,550
Total United States	3,620,300	.....	3,639,400‡	3,811,320

* Net daily average, considering general shutdown May 1, and 14 shutdown days in East Texas field.
† Recommendation of Central Committee of California Oil Producers.
‡ Texas, California, Oklahoma, Louisiana, Kansas, Arkansas, Michigan, New Mexico.
‡ Estimate for East Texas field revised.

WORLD-WIDE DEVELOPMENTS

By WM. V. GROSS, Associate Editor

Mexico

About-Face of Labor Leader Surprise in Some Quarters

Rafael Suarez, secretary general of the Petroleum Workers Union which has gone on record opposing President Cardenas' plans for reorganization of the Mexican oil industry personnel on a scale which might allow the industry to make money, June 2 issued a signed statement in Mexico City declaring that rank and file opposition to the president's plans was being stirred up by a disgruntled minority.

The statement of Suarez came as a surprise in certain quarters inasmuch as it was a matter of record that the properly qualified representatives of the union were the ones who officially opposed certain of the president's proposals. Official union counter proposals to Cardenas' plan for reorganization, which was, briefly, a cut in personnel and in executive salaries, embraced an arrangement for turning the administration of the oil industry over to the workers. This Cardenas flatly refused.

There was some speculation as to whether government pressure was responsible for the changed tune of the union June 2, as represented by Saurez's appeal to "loyal" members of the union to resist the "disorienting" propaganda of the anti-administration factor and support Cardenas' plan. The president of Mexico, as a matter of fact, is empowered legally with executive authority to institute any reorganization scheme. And the history of his administration and the carrying out of his Six Year Plan has been that he will listen to rational—and irrational—demands of labor just so long as those demands do not interfere with his plan for nationalization of industry and resources.

Suarez assured the labor syndicate's 160,000 members that the basic employes of the oil industry would not be affected by the president's program. The basic employes are considered to be those who were on oil-company pay rolls when the expropriation ax fell on the majority of the above 160,000 men.

It has been estimated that dismissals under the economy program will involve more than 2000 men if the industry meets the president's stipulation that unnecessary jobs be eliminated, transitory workers be reduced and no vacancies be filled. Strangely, failure of the oil companies to adopt a policy contrary to that reflected in the above presidential demand was cited as part of the alleged justification of the expropriatory action.

Both government and labor officials have mentioned the 22,000,000-peso deficit of the Mexican oil industry in 1939. Oil administration officials blame the deficit on lack of cooperation from the laborers and union. A militant section of the union, on the other hand, says that blame for the deficit, as well as the reason for Cardenas' demands, must be laid on the incompetence of the industry's administration.

Suarez said this section, aided by those workers whose jobs are threatened, was trying to undermine union support for the presidential plan by attacking the oil administration.

This latter statement of the union's secretary general brings up two possibilities. One is that Suarez, having cognizance of the punishment meted out in the last 10 days throughout Mexico to those showing a tendency to align themselves to the banner of Almazan, independent candidate for president, is bidding for political favor from leaders of the Revolutionary party. The second is that the militant section of the union is beginning to believe that a compromise might be obtained from the president on his flat refusal to turn the administration of the industry over to the workers in view of his desire for their unanimous support of Comacho, the Revolutionary party's candidate for president.

While press dispatches emanating from Mexico are replete with impossibly glorious promises from both candidates, private tenterprise, including what is left of the oil business, quietly is lending considerable moral backing to the independent candidate, hoping he will be less annihilative in his attitude toward business than the Cardenas-endorsed candidate. Comacho, though, is

Turkish Prime Minister Reyfik Saydam (in slicker) inspects the Siir region, where Turkey's first major oil field was opened recently. Discovery of oil in commercial quantities adds Turkey to the list of countries coveted by the oil-hungry axis partners. Turkish troops are standing ready for action if Italian forces in Albania move against Greece, a possibility brought nearer by last week's developments.

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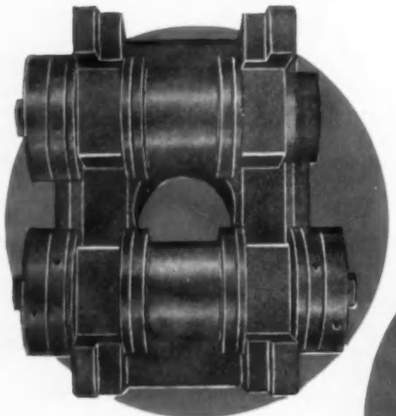

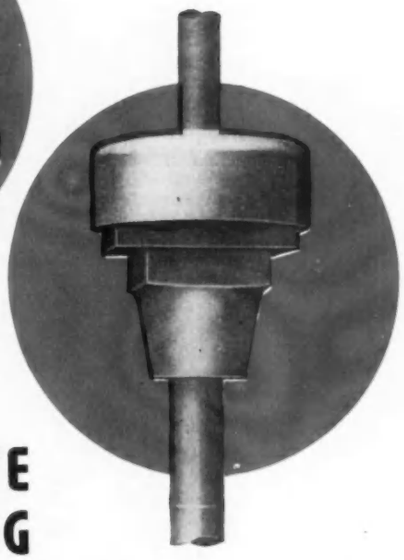

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generally held to be somewhat less rabid on nationalization and socialization than the present head of the Mexican republic.

Frankly, however, the outlook for the expropriated oil companies as affected by results of the coming election in Mexico is not bright. Punitive measures, such as dismissal from jobs, already are being taken against those showing a tendency in political attitude to recognize the rights of capital along with those of the government. Labor syndicates are passing rulings, or having rulings passed, which make it possible to discharge, without pension, those of 28 or more years of service in certain lines. Which is another way of saying those who held jobs under President Huerta (and are therefore to be considered anti-Revoluntionaries) may be discharged without reason or investigation into the quality of their work.

Report $3,000,000 Offered For Cities Service Properties

Mexico has offered Cities Service Company $3,000,000 as compensation for expropriated oil properties, according to reports circulating in Mexico City last week.

The Mexican government is said to feel that a settlement with Cities Service Company would further strengthen the nation's diplomatic position in dealing with the United States and shatter the "united front" of the American and British oil companies against that type of expropriation.

Standard Oil Company of New Jersey representatives were quoted in Mexico City news dispatches as expressing the opinion that an agreement between Cities Service Company and Mexico would not weaken Standard's determination to have no dealings with Mexico, and would not persuade the United States Department of State to refrain from denouncing the expropriation as a denial of justice.

France

Government to Exploit New Saint-Gaudens Field

The recently tapped oil field in the Saint-Gaudens district is being readied for complete exploitation by the French government.

Under the direction of M. Pineau, attached to Le Bureau National des Combustibles Liquides, prospecting was commenced in June, 1938, and in April of last year an oil pay was tapped. While awaiting arrival of American machinery, continued tests were conducted that seemed to prove the optimistic forecasts made in the reports of various experts. During a 3-hour test May 9, when the oil was allowed to run free for the first time, over 2000 gallons were recovered. Flowing under natural gas pressure, the oil is 22-gravity, a medium grade profitable to refine.

The Saint-Gaudens field is the second French producing area, the other being located in Alsace, close to the German frontier. Saint-Gaudens is not far from the Spanish border. Exploration is underway in several other sections of France, as well as in French African possessions.

Kansas

New Ellis County Pool Opened by Arbuckle Test

Gulf Oil Corporation and Gled Oil Company opened a new producing area 2½ miles northeast of Toulon pool, Ellis County, at Sanders 1, CN½ SW SE 33-13-16w. Arbuckle lime, topped at 3450 feet, was drilled 8 feet. A 10-barrel oil load preceded a 2000-gallon acid job, and this was chased with another 30 barrel oil load. Rods were run to pump and the test is estimated good for 100 barrels daily.

A fluid-level potential of 2300 barrels was established by Aylward Producing Company and Central Petroleum Company's Haska 1, CE½ SE SE 6-16-10w, being 1 mile west of production in the Stoltenberg pool, Ellsworth County. Arbuckle lime, topped at 3273½ feet, was penetrated to 3292 feet, and 5½-inch casing cemented at top of the lime. In 3 hours, oil rose 200 feet in the hole and later began flowing at a rate of 25 barrels hourly. Crude tested 42.5-gravity. Offsets will be forced by Skelly Oil Company to the south, and Cities Service Oil Company to the southeast. Pay at the Haska 1 was treated with 3200 gallons of acid. No water was showing.

The semi-wildcat checked 58 feet higher than Magnolia Petroleum Company's Skalicky 1, CW½ SW SW 4-16-10w, a test abandoned at 3307 feet in Arbuckle lime. Structurally, it was 18 feet lower than Beardmore and Rosenthal's Talsky 1, CE½ SE NE 8-16-10w. One mile southwest of Haska 1, Gulf Oil Corporation had a duster at 3394 feet in the Arbuckle in CW½ SW NW 7-16-10w. A south extension test failed to commercialize and was abandoned. Sharon Drilling Company and Atlantic Refining Company's Novotny 1, CN½ NW NE 32-16-10w, 1½ miles south of production, jetted 2000 gallons of acid into pay at 3293-18 feet. Swabbing rate was ½ barrels an hour after 1000 gallons, and another treatment failed to increase production. After being shut in for 8 hours, hole filled 400 feet with oil. A 12-quart nitro shot also failed to affect production, and the test was abandoned.

A major set-back was indicated in Ellis County as Central Petroleum Company's Marshall 1, CNL NW NW 24-11-18w, approximately ⅜ mile southwest of the Burnett pool, was drilling below 3600 feet without encountering Arbuckle lime. Darby Petroleum Corporation has considerable acreage surrounding this test on the southwest trend of production.

Chase Pool Extended

Chase pool, Rice County, was extended ¾ mile northwest when McPherson Drilling Company's Patton B-1, SWc 9-19-9w, established a maximum potential of 3000 barrels daily. Arbuckle lime was drilled to 3213 feet.

James Davis extended Whelan pool ¼ mile west at Nuckols 2, C SE NE 30-31-11w, Barber County. After an 80-quart shot in Mississippi lime at 4323-4376 feet, the well began making 75 barrels of oil daily.

Hazlett pool, Butler County, was moved ¾ mile east when J. H. Wagoner et al's Ramsey 1-A, SW NW SE 8-24-5e, pumped 90 barrels of oil the first 24 hours and then declined to 18 barrels of oil and 5 barrels of water per day. Pay is Kansas City lime at 2088-93 feet, being topped at 2087 feet. Hole is bottomed at 2096 feet in the lime, which was treated with 500 gallons of acid.

Stanolind Oil & Gas Company's Esfeld 1, CS½ SE NE 28-16-11w, swabbed 4 barrels hourly but will acidize to increase production. Arbuckle lime was logged at 3346-59 feet. This test extends the Prusa area, Barton County, ¼ mile. Same operators are attempting to locate the connecting link between the Hall and Coralena pools, Russell County. Hefferman 1, CNL NW NE 4-15-13w, cored small shows of oil through the Lansing lime and was looking for Arbuckle lime below 3215 feet.

A Cunningham pool outpost in Kingman County was abandoned. W. H. Gaddis et al's Shannon 1-A, CE½ SE SW 11-27-10w, 3 miles northeast of production, logged dry Viola lime at 4293-4315 feet. A drill-stem test at 4013-4048 feet in Mississippi lime, open 45 minutes, recovered 180 feet of mud and oil and 240 feet of water.

Cities Service Oil Company's Rochester Trust 1, SEc NE 11-13-15w, 2½ miles north of North Atherton pool, Russell County, was a wildcat failure. Arbuckle lime, topped at 3238 feet, was stained at 3252-53 feet and test was abandoned at 3258 feet.

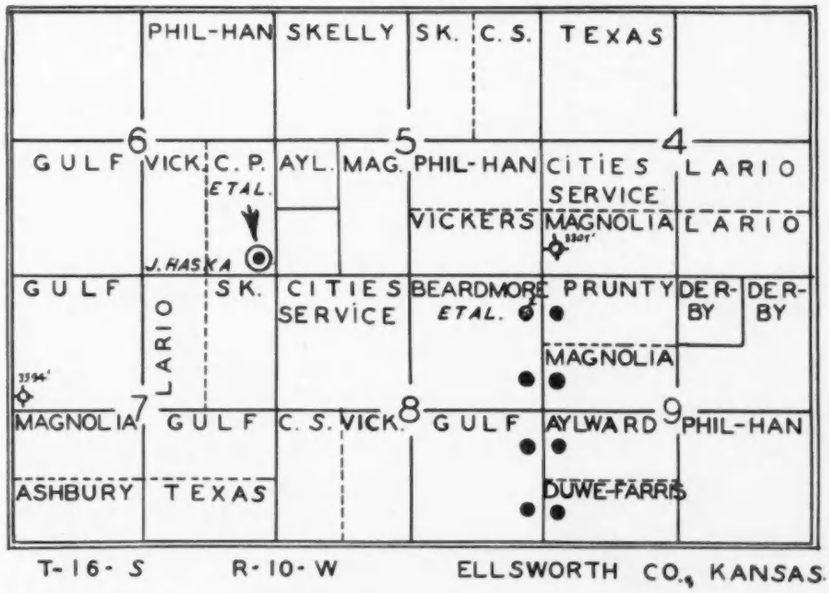
In North Bornholdt pool, Rice County, Central Petroleum Company had derricks up for two tests. Kidd 1, CS½ NE SE 12-20-6w, farthest northwest test in the pool, and Duvall 1, CN½ SE NE 13-20-6w, in the pool proper. Same operators' Swanson "B" 2, CSL SW NW 18-20-5w, McPherson County side of the pool, was showing for a minimum producer. This was a disappointing test, as the north offset flowed 170 barrels per hour initially, and a south offset also made a large producer.

In the South Gurney Lansing lime pool of Russell County, Central Petroleum Company's Jules Boxberger 3, CEL E½ SE 26-14-14w, acidized pay at 2997 feet with 8000 gallons and rated a maximum state fluid-level potential of 3000 barrels daily.

Five miles northwest of Rahn pool, Cowley County, W. M. McKnab moved in a rig at McKown 1, NEc SW 31-33-5e, due south of the McCollum gas area. Snyder 1, CW½ NW NW 15-34-3e, a wildcat pool opener east of Gueda Springs pool in the Cowley County, found water in Arbuckle lime and plugged back to test the Bartlesville sand at 3270-80 feet. When previously drilled into this sand, the hole filled 2000 feet with good-gravity oil.

Foster Oil Company's Howard 2-A, CE½ SW SW 8-34-4e, a wildcat on the

STOLTENBERG POOL



Aylward Producing Company and Central Petroleum Company's Haska 1 extended Stoltenberg Pool production a mile west with a potential of 2300 barrels daily.

edge of the Arkansas City gas pool, Cowley County, gauged 1,200,000 cubic feet of gas in the Stalnaker sand at 2115-18 feet. Drilling was resumed below 2625 feet.

Forest City Basin

Small Show Recovered at 1440 Feet in Kansas Sector

A small show of oil was logged at McCain et al's Doan 1, CE¼ NW SE 34-12-22e, Johnson County wildcat in northeastern Kansas. Hunton lime, topped at 1428 feet, was drilled to 1500 feet. The show was marked at 1440-42 feet.

Trend of the Falls City pool in Richardson County, Nebraska, should be indicated by two new tests staked south and east of the discovery. P. L. Kent, of St. Joseph, located Ulin 1, S½ SW SE 16-1n-16e, 1¼ miles east and slightly south of the Bucholz producer. Rotary tools will be moved in to drill this Hunton lime test, a farmout of L. M. Tully, Los Angeles. Harry Harper, Odessa, Texas, was drilling below surface pipe at Seibbernsen 1, SE NE NW 20-1n-16e, just southeast of the Bucholz well.

Pawnee Royalty Company's Bucholz 1, C NW SW 17-1n-16e, largest producer in the pool, began state production test on May 29 to try for a $15,000 prize award for the first commercial well to produce 50 barrels daily for 60 consecutive days. In 4 hours, the producer made its first day's quota.

The play spread north into Nemaha County as J. O. Isaacs et al located Lehr 1, SEc 25-5n-14e, 4 miles southeast of Auburn. H. J. Galamba, of Sonken-Galamba Corporation, Kansas City and others staked Ord 1, NWc 8-5n-14e, 3½ miles northwest of Auburn.

Forest City Basin Syndicate's Windle 1, SE NE SE 3-1n-15e, spudded with cable tools and was rigging up heavier equipment. Rotary tools have been assembled for two more tests, one to the north and one to the south. E. L. Dodge, Tulsa, a member of the syndicate, is drilling the test.

Uhri Oil Corporation was cleaning out at 600 feet in Stauffer 1, SWc NE 22-1n-13e, farthest west test in Richardson County. Their Ogle 1-A, NW SE SE 9-1n-14e, cemented 8-inch pipe at 380 feet and shut down at 1660 feet.

The Forest City discovery, Pawnee Royalty Company's Boice 1, CSL N½ NE NE 18-1n-16e, after acidizing with 1500 gallons, swabbed 25 barrels of oil in 8 hours through casing. After swabbing 4 additional hours, the hole filled 1400 feet with water. Five sacks of cement were then dumped on bottom for a shut-off.

In the western sector of the state, C. L. Price's Bonner 1, SEc 10-23n-49w, Morrill County, was drilling around 3915 feet in an 8-inch hole. Dan Kornfeld et al's Mathies 1, NEc 22-5n-1w, was drilling at 2500 feet.

In Douglas County, Kansas, Kerlyn Oil Company shut down at Wise 1, CSE SW 28-12-20e, near Lawrence, at 1588 feet. Six-inch casing was cemented at 1185 feet, top of the Mississippi lime.

Trend of the Falls City pool, first Forest City strike, should be determined by tests staked last week.

Three wildcats were drilling in Missouri, while 5 were shut down. Roach-Vincent et al's Dillingham 1, CNL NE SW 16-53n-34w, topped Mississippi lime at 1060 feet, cemented 8-inch pipe at 1065 feet, and was rotating below 1275 feet. Brin & Nathan's Decker 1, C NW NW 1-61n-38w, was below 1500 feet after cementing 10-inch surface pipe at 1065 feet.

Ettington et al's Clark 1-A, NEc SE 8-63n-14w, logged Mississippi lime at 310 feet with a good show of gas; topped Hunton at 739 feet, and Viola lime at 970 feet for a show of gas. It was deepening below 1025 feet.

Oklahoma

Wildcat Failures Mark Week of Routine Activity

Wildcat disappointments overshadowed routine activity as several tests failed to find productive zones. Olson Drilling Company and Anderson-Prichard Oil Corporation's Geis 1, CNE SW 15-18n-9w, Kingfisher County venture, recovered hard white sand without shows in first Wilcox sand at 9265-74 feet and the second at 9316-9404½ feet. From perforations in a dolomitic lime at 7357-60 feet, this wildcat was formerly completed for a gas well, making some distillate.

Three miles south of Crescent pool, Logan County, Kerlyn Oil Company et al's Chitwood 1, NEc SW 15-16n-4w, topped Wilcox at 6580 feet and recovered a core at 6590-6602 feet with 8 feet of sand and 4 feet of dolomite. It showed staining, gas odor with a taste of salt water. At 6651 feet, the bit was in lime and operators will core again when the sand softens. Structurally, the wildcat is low with the following tops on markers: Layton 5020 feet, Checkerboard 5054 feet, Hogshooter 5240 feet, Oswego 5767 feet, Mississippi 6120 feet, Woodford 6157 feet, and Hunton lime at 6263 feet.

F. B. Murta and Wilson's Harber 1, CW½ NE SE 4-10n-6e, 2 miles west of Keokuk pool, Seminole County, filled with salt water when plugs were drilled in Misener sand at 4243-60 feet. A core revealed good saturation and odor, although the sand was tight.

In McIntosh County, Phillips Petroleum Company abandoned Blankenship 1, CSW NW 33-10n-13e, 6 miles east of the Dustin gas pool, at 3911 feet. First Wilcox sand, logged at 3848 feet, showed water. Hunton at 3691 feet also showed water. Devonian Oil Company plugged Scott 1-A, SEc NE 19-18n-5e, between March and March North pools, Payne County, at 4041 feet in the Wilcox sand. No shows were reported.

An important wildcat test will be started in Payne County by Summit Drilling Company and J. A. Padon at Arnold 1, NW NE NW 8-19n-2e, 7 miles north of Ramsey pool and 10 miles northwest of Stillwater pool. The area has been worked with seismograph and core-drill. Surface geology indicates a definite high. It is a scheduled 5000-foot test to the Wilcox sand. A number of major oil companies with surrounding acreage are supporting the test and include: The Texas Company, Sinclair Prairie Oil Company, Gulf Oil Corporation, Sun Oil Company, Magnolia Petroleum Company, Phillips Petroleum Company, Mid-Continent Petroleum Corporation, Hanlon-Buchanan, and T. N. Berry.

A new gas area was opened by C. A. Yoakam et al's Long 1, C SW SE 34-12n-9e, 5 miles east of Dill pool in Okfuskee County. Flow was gauged at 7,000,000 cubic feet with 1400 pounds casing pressure. Pay is Hunton lime at 3771-3826 feet.

Two Hunton lime pool openers were completed in Pottawatomie County. Alma Oil Company completed Harrington 1, NW SE NW 24-9n-4e, for a potential 75 barrels of 36.8-gravity crude in 24 hours through tubing. Pay was acidized with 3000 gallons. J. W. Meazel et al's Billington 1, SE NE NE 26-9n-4e, perforated Hunton at 4196-4214½ feet with 51 shots. After 1000 gallons of acid, the well flowed 70 barrels of 37-gravity oil and 5 barrels of water in 24 hours. Both tests are southwest of West Earlsboro pool.

A small pool opener was indicated in Beckham County. Fred Coogan's Kinchen 1, SEc 4-9n-25w on the north edge of the Erick gas pool, swabbed 12 barrels of oil and 40 barrels of water per day. Pay is dolomitic lime at 3686-96 feet. Gas is estimated at 3,000,000 cubic feet.

A deep Arbuckle lime test in Tillman County was checking unfavorably. Gulf Oil Corporation's Owens 1, NEc 27-4s-15w, 4 miles southwest of Grandfield, topped Arbuckle at 4023 feet and was drilling below 4175 feet without shows. Helmerich & Payne are operating the tools. North of Holiday in Comanche County, J. C. Jenkins abandoned Whitehead 1, NEc 3-1s-13w, at 505 feet.

Indo Oil Company may prove a new Dutcher sand pool in Creek County with Slick Estate 1, NWc 1-16n-9e, northeast of the Bristow area. Sand was logged at 2919-23 feet. Operators were erecting tankage after hole filled 1600 feet with fluid, mostly oil.

Sinclair Prairie Oil Company's German 1, SW NW NW 1-6n-13w, deep test in Caddo County, plugged back to 2450 feet to test Pontotoc conglomerate at 2030-2450 feet. This wildcat penetrated to 11,026 feet in the Arbuckle lime. Simpson zone at 9205-9370 feet was shot with 400 quarts but showed only 100 feet of dead black oil. Simpson was topped at 8810 feet, first Wilcox sand at 9179 feet, green shale break at 9445 feet and second Wilcox sand at 10,074-117 feet.

An Arbuckle lime test was staked in Tillman County, Southern Oklahoma: Daley Oil Company's Bryant 1, SWc

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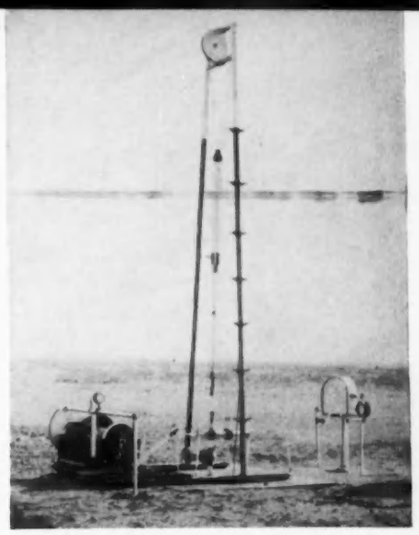

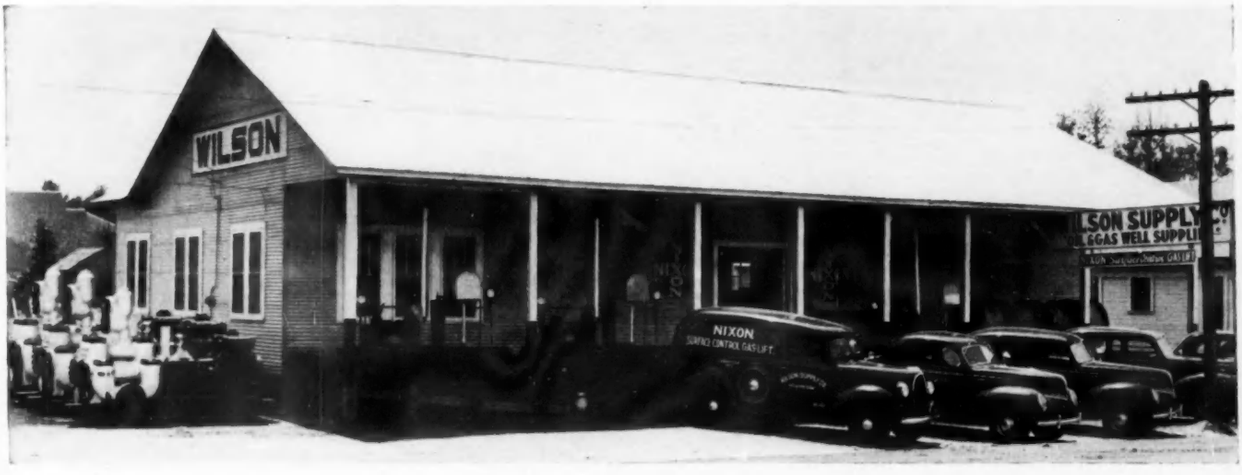

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NW 33-2s-17w, Carter Oil Company farm-out.

Two deep wildcats will test the flank of the Cement structure in Caddo County. Ray Stephens, Inc., staked location in SEc NW 6-6n-9w, about 5 miles north of production on a block of 6000 acres. This is a projected 8500-foot test. Four miles south of Cement pool, J. S. Graham & Son have a proposed location on a large block which centers around Section 35-5n-9w. Both Indian Territory Illuminating Oil Company and Sinclair Prairie Oil Company have seismographed the Stephens location. Original geology was mapped by Clyde Becker, Chickasha, and more recently by Cliff Keeler, geologist for Ray Stephens, Inc.

W. O. Allen located Freeman 1, SWc SE 24-19n-5e, south of Yale-Quay pool in Payne County. In the same county H. & H. Oils, Inc., started work at Linsenmeyer 1, SEc SW 3-18n-4e, 2 miles south of Ingalls pool and west of West Norfolk pool. This is a Wilcox sand test on a spread of some 600 acres.

Four wildcats were staked in Kay County, Northern Oklahoma. M. J. Armer & Dwight J. Wilson have a rig at Deimer 1, NE NW SW 28-27n-1w, south of gas production in the Blackwell area. Alma Oil Company staked location for Gestling 1, SEc 14-27n-2e, near Kildare. E. H. Langston announced two locations in the county. One in SW 29-28n-2e, 3 miles west of Newkirk on a 4000-acre block and the other in SEc NE 14-28n-1w, 2½ miles southwest of Braman on a 3200-acre block.

In Kiowa County, Gene Burke was drilling with a machine below 400 feet at Morgansen 1, NWc SW 6-2n-16w, east of Snyder. W. M. Curtess et al spudded Hunsinger 1, NW SW SE 17-5n-15w, east of Coopertown in southern Kiowa County, on a 1700-acre block of leases. A. A. Wisdom started work at Dolen 1, NWc NE 15-1s-8w, southwest of Duncan, for a 3000-acre test. A block of 3100 acres has been assembled.

Indiana

Rockport Gas Field Has New Sand at 650 Feet

A new horizon was added to the Rockport gas field of Spencer County when Kentucky Natural Gas Company's Hall Wirthwein 1, SW SW SE 29-7s-6w, was completed for 1,500,000 cubic feet daily at 648 feet. The new sand was topped at 641 feet.

In Point Township, Posey County, La Salle Drilling Company was rigging up for People's Savings Bank 1, SE NW SE 26-7s-15w, 1000 feet southwest of Ryan & Brown's Spencer 1, still testing Aux Vases with a promising pool-opener.

In Vanderburgh County, German Township, Vanderburgh Oil Corporation's George Hornby 10, NW SW 35-5s-10w, wildcat on a shallow-sand producing lease, was down 2200 feet, testing a show of oil in the McClosky.

Abandoned was Sam Travis et al's Moyer 1, Warrick County, near Millersburgh, NW SW NW 13-5s-9w, at 1920 feet depth, with sulphur water in the McClosky.

Illinois

Pools Added in Jasper And Wabash Counties

Two pool openers were completed, one in Jasper County and the other in Wabash County. A well flowed 10,800 barrels in 24 hours from the Devonian lime in the Centralia pool.

Jasper County, which recently entered the Illinois oil picture with opening of the Boos field, was given another pool by successful completion of The Pure Oil Company's Mattie Aldridge 1, CE½ NE NW 17-5n-10e, 3 miles south and west of the Boos area. The Aldridge well flowed 1422 barrels in 24 hours without an acid treatment, from McClosky lime at 2850 feet.

The Wabash pool opener was Burr Lambert's Seiler 1, SE SE SE 27-1s-13w, which flowed 18 barrels in two hours natural through open casing. At an elevation of 410 feet, the Glen Dean was topped at 2040 feet and pay was cored at 2617-26 feet. Tubing was being run for further testing.

The large completion in the Centralia field was W. C. McBride's Carson 8, a north Devonian outpost, SE 35-2n-1w, which flowed 10,800 barrels in 24 hours from Devonian pay at 2894-2913 feet after a 5000-gallon acid treatment. Not only is it the largest well drilled in the field, but it was credited with the greatest production ever assigned an Illinois well for a full 24-hour period. Other completions in the Lake Centralia-Salem pool, 11 miles east of the McBridge producer, were rated as potentially greater on the basis of 3- to 12-hour tests. The site is two locations south of the field's northernmost production from shallow horizons, the Benoist and Stein sands. For that reason many operators were of the opinion that Devonian production in the pool would extend further north and west than does production in the higher levels.

Centralia Trenton Test

Tubing was being run at the field's first Trenton lime test, Ames-Hicks F. Brown 1, Lot 10, Block 5, Second Home Terrace addition to the city of Centralia, from which some oil has been recovered in bailing and swabbing. Twenty-three feet of pay, topped at 4018 feet, was cored, and the test is bottomed at 4067 feet. If an acid treatment does not satisfactorily increase the well's output, it may be deepened with cable tools.

Carter Oil Company's pool opening well in Coles County, 2 miles south of Mattoon, J. H. Seaman 1-A, SE NE SW 35-12n-7e, flowed 170 barrels in 16 hours in its best test from McClosky lime at 2002-12 feet, total depth 2027, after acid treatments of 2000 and 4000 gallons. However, production was declining and early in the week the well made 82 barrels in 24 hours. It is probable that it will be placed on pump within a few days. Meanwhile, the company was rigging up for a new Coles County wildcat, J. E. Cobb 1, C SW SE 10-13n-7e, 6 miles north and a mile west of Mattoon.

Two important wlidcats were started in Washington County. The Ohio Oil Company's Buchner 1, NE NW 9-2s-2w, Beaucoup Township, is slated to test the Devonian unless commercial production is found at a lesser depth. In an area highly regarded but heretofore untested, the venture is being closely watched. In Irvington Township, a mile south of the town of Irvington, Gulf Refining Company was drilling below surface pipe at Buhl 1, C NW SE SW 23-1s-1w, also slated to test the Devonian. There is no production in the area.

Lake Centralia-Salem

Activity in the Lake Centralia-Salem pool of Marion County was highlighted by the completion of the 2000th well. The field was opened two years ago the latter part of this month, and is now producing about 250,000 barrels a day from five horizons. An immediate test of the Trenton horizon is contemplated if a well in that formation is successfully completed in the Centralia pool, 8 miles west. The field's east Devonian outpost, Joe Miller et al's Foster 1, NW SW SW 11-1n-2e, was drilling below 3551 feet after a fishing job, with the Devonian horizon expected momentarily.

A new productive level was in sight for the new Albion pool of Edwards County, where Jarvis and Marcell were testing Bridgeport sand at 1552 feet in Harry Wick 4, SE NE 24-2s-11e.

New Mexico

Start Test Between Mattix and Cooper Areas

Six Lea County pools were assigned 10 new operations the past week as compared to 8 the previous week. The Maljamar area gained 3 tests while the Arrowhead and Mattix fields each added a pair to be drilled by majors.

Continental Oil Company et al erected derrick for Vaughn 1-B-12, C SE NE 12-24s-36e, offsetting production in the Toby sector, which has possibilities of developing into an important drilling center. It is situated between the Mattix and Cooper fields and supposedly is a dry gas belt. Structural conditions are somewhat similar to those present in the Arrowhead pool, which has proved to be the most prolific oil area currently undergoing development in the county, although classed as a gas area prior to June, 1938. Skelly Oil Company's Toby 1 refuted the dry gas theory applied to the Toby sector in making an oil well in April, 1938, although offsetting a gasser, and produced 32,439 barrels of oil through 1939. Western Gas Company's Toby 1, originally a gasser and completed February 1937, converted to oil and has a cumulative yield of 42,343 barrels. A north offset was placed on production as an oil well last January.

Gulf Oil Corporation's Drinkard 1, projected deep test for the east flank of the Penrose field, passed up small yield of free oil in soft lime at 3794-3804 feet, and was drilling at 3950 feet, using cable tools.

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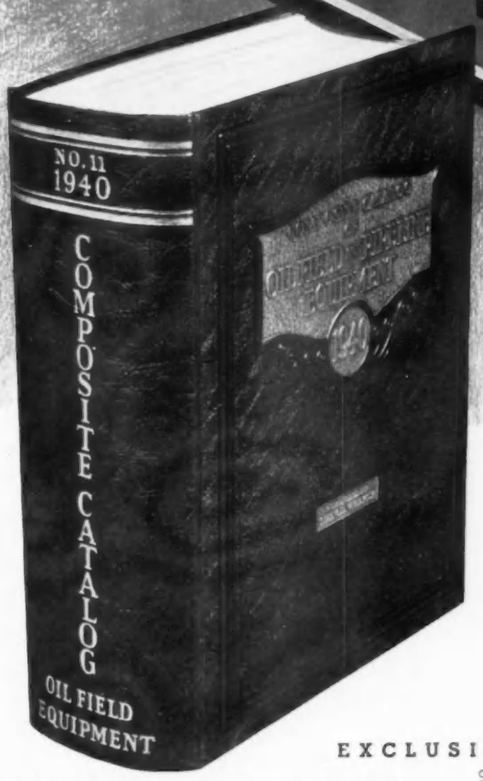

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West Texas

Further Testing to Follow Andrews County Strike

Wildcat oil strike for Andrews County was recorded last midweek when Helmerich & Payne and Atlantic Refining Company's University 1, C NE NE Section 11, Block 11, swabbed 3 barrels of oil hourly after two-stage treatment with 6000 gallons of acid, Production is from broken saturation at 4260-4425 feet. Further testing is scheduled with expectation of perpetuating short-term lease. This wildcat originally was contracted to drill to the Holt zone, or 5500 feet. Atlantic Refining Company recently made location for a north offset and another test situated 2 miles south in anticipation of profitable production.

Lewis, Shannon & Graham's Noelke 1, east offset to the Soma pool prolific discovery in western Crockett County, swabbed and flowed 85 barrels of oil through casing on 23-hour test from broken saturation at 1064-1100 feet in Yates sand, topped at 900 feet. The failure of this second well for the area to encounter the big gas flow found with the oil by the discovery substantiates the theory of a crevice condition. Subsurface control gained from the wells and dry holes to the south and west reveals favorable structural features. The Permian lime series immediately below the Yates is considered a good prospect for production.

The Delaware discovery on the Quito structure, Ward County, drilled by Slack et al on the Hayes tract, may be completed as a gasser to supply fuel for drilling one or more tests. The well is shut in having tested 10,000,000 feet of gas with spray of oil and water from sand at 5041-90 feet. It is the largest gasser completed in the Delaware.

Lease purchases and development obligations concluded lately provide preliminary steps toward expansion of the Wasson field north. A single dry hole near the center of a 12-mile front, involving J. W. Murchison and Leland Fikes' Sawyer 1, C SW SE Section 702, has been discounted as decisive, as it was abandoned in January, 1938, at 5255 feet without a test. Production has been advanced to half-mile south of the failure, and High Point Oil Company and Grady Vaugh's Smith 1, C SE SE Section 703, ¾-mile west, is drilling at 2000 feet on a 1000-acre block. Osage Drilling Company purchased N½ Section 701, while Mabee Oil & Gas Company paid a bonus of $25 per acre cash for lease on N½ Section 700. Don Danvers assumed a development obligation in acquiring sublease from Oil Development Company of Texas on all of Section 739.

Eastern Yoakum County gained an active wildcat through Plymouth Oil Company having started operations on Brownfield 1, C NE SW Section 620. It is on acreage farmed out by Amerada Petroleum Corporation, owner of 2900 acres in the immediate area. The test is 4 miles east by south of the Waples-Platter one-well pool, and is on a geophysical prospect.

Gradual enlargement of drilling operations in the Slaughter-Duggan district, most northerly producing area in the basin, is to follow the entrance of The Texas-New Mexico Pipe Line Company's 8-inch line. The productive area embraces between 25,000 and 30,000 acres, and is destined to be enlarged materially. Magnolia Petroleum Company's Mallet Land & Cattle Company 1, northeast outpost for the Duggan sector, was coring at 5005 feet, having logged first oil-stained lime at 4975 feet.

Magnolia Petroleum Company and Atlantic Refining Company's H. & J. 1-221, C NE NE Section 221, Block G, extended the Seminole field south with a natural flow of 785 barrels of oil in 9 hours through casing while running tubing. Production is from broken lime at 5070-5243 feet. Harry W. Bass et al's Austin 1, east offset, is awaiting proration gauge after indicating a natural flow of 30 barrels hourly through tubing from lime at 5280 feet. The latter is on a 320-acre lease farmed out by Standard Oil Company of Texas. Magnolia Petroleum Company and Atlantic Refining Company's H. & J. 5-265, west edge of the north end of the field, earned a potential rating of 724 barrels through ½-inch tubing choke after using 2000 gallons of acid at 5115-5306 feet. This partnership has 6 operations underway.

Linking of the Foster-Johnson and North Cowden fields, Ector County, advanced a step nearer realization when Sinclair Prairie Oil Company's Johnson 1-F-64, NEc SE T&P Section 28, Block 43, T-1-N, indicated commercial production in drilling to 4247 feet. It will be shot with nitro. This outpost logged top of Yates at 2940 feet, and solid lime at 3940 feet with an elevation of 3030 feet.

North Texas

New Eastern Montague County Area to Have Steady Activity

Three offsets to the Bonita pool northeast extension well are underway, and it is quite probable that development of this eastern Montague County deep lime area will be continuous. The extension well, Magnolia Petroleum Company's Gilbert 1, SWc of 222½-acre tract, C. G. Bryant Survey, gauged 263 barrels of 40-gravity oil on 3-hour open tubing test, with gas volume rated at 1,000,000 feet daily. Casing pressure dropped from 1200 to 450 pounds, and tubing pressure was lowered from 800 to 80 pounds during the official test. Production is from saturated conglomerate at 5426-34 feet in lower Bend lime series, topped at 5205 feet. Magnolia Petroleum Company's Gilbert 2 was rigged up as an east offset. Sinclair Prairie Oil Company's Pearl M. Lee 1, and M. M. Gilbert 1 are south and west offsets, respectively, to the outpost producer.

The fourth authorization for the week was Sinclair Prairie Oil Company's Admire 1, a south offset to the company's Howard 2, which flowed 310½ barrels oil natural in 3 hours through 7-inch pipe after perforating casing with 86 shots at 5443-58 feet. The company's David Doty 1, west offset to the Bonita pool discovery, flowed 226 barrels oil in 3 hours through open tubing, having perforated pipe with 10 shots at 5436-38 feet. The latter and Howard 2 were carried to Ellenburger lime at 5820-6025 feet and 5803-52 feet, respectively, after missing the Bonita discovery pay at 5240-49 feet. Sinclair Refining Company built a 6-inch line into the pool immediately after the first well was completed February 21 for a potential flow of 264 barrels of 40-gravity oil in 3 hours.

Western Montague County has several wildcats near decisive levels in the Bend formation, and the Ringgold pool gained its second oil producer. British-American Oil Producing Company's Martin 1, SEc SW H&TC Section 27, Block 4, advanced production ½ mile north from saturated conglomerate at 6581-95 feet in Bend series, topped at 5643 feet. The well flowed 75 barrels oil per hour when given several brief gauges while awaiting completion of Magnolia Pipe Line Company's pipe line extension from W. B. Omohundro's Seay 1, pool discovery which flowed 240 barrels 47-gravity oil on 3-hour gauge through equivalent of ⅜-inch bottom-hole choke from conglomerate at 5690-5704 feet in Bend, topped at 5654 feet. Fain-McGaha Oil Corporation's Spring 1, west offset to the discovery, was drilling at 5210 feet, and Gulf Oil Corporation's Worsham Estate 1, southwest offset, was preparing to spud.

Sinclair Prairie Oil Company's Milam 1, SEc Section 54, Abel Beason Survey, 3½ miles northeast of the Omohundro strike, is slightly higher on structure when correlated with the two Ringgold wells. Core pulled in Bend conglomerate at 5627-34 feet yielded oil show and stain, but drill-stem test at 5622-34 feet proved dry. Coring was resumed. Harvey Drilling Company and Sinclair Prairie Oil Company's Threadgill 1, 4 miles northwest of Stoneburg and south of the Ringgold activity, was drilling shale at 5630 feet on a 5700-foot contract. Since it is situated at a lower point in the syncline, a new contract must be made to reach the Bend objective.

Repeated Tests Fail

Walter Gant and Continental Oil Company's Brown 1, 5½ miles northeast of Bowie, is slated to be abandoned after 7-inch pipe, cemented at 6840 feet, collapsed at 2100 feet while swabbing test was underway. This wildcat has been in process of completion 6 months, trying to make a producer from oil saturation at 6074-94 feet in Bend, topped at 6077 feet. The Mississippian was topped at 6390 feet, followed by Simpson at 6880 feet and Ellenburger at 7288-7333 feet. Nominal saturation was logged in the latter two zones, thereby enhancing the prospects of deeper producing zones in the general area. The casing was virtually worn threadbare by the prolonged tests

in trying to make a commercial producer from the Bend. A total of 42,000 gallons of acid solution was used in making 8 injections through casing perforation resulting in a small column of oil with drilling fluid. Gant and others have awarded contract for the drilling of another deep wildcat in the district, with location slated for the R. Mallard or F. Cook Surveys.

Sinclair Prairie Oil Company's Benton 1, ½ mile east of Nocona townsite, passed up promising oil show in upper Strawn and was drilling at 4970 feet with the Bend as the objective. Rogers & Rogers' Burnett 1-B, situated near deep failures on the south end of the Nocona field, proved an exception in developing flowing production when formation tester was used on saturated conglomerate at 5234-51 feet in Bend, entered at 5220 feet. Additional saturation cored at 5280-91 feet yielded water, and a test was to be made of a lower oil zone, topped at 5315 feet. Sunray Oil Company and Ramsey Petroleum Corporation's Stambough 1, offsetting a failure on the southwest edge of the structure, flowed 87 barrels oil in 5 hours through 1-inch choke after perforating at 5195-5203 feet. Conglomerate pay was logged at 5199-5219 feet, with broken saturation to 5285 feet. Top of Bend was called at 5186 feet. Nineteen wells in the 3 pay levels have a top allowable of 77 barrels daily during June, but wells on less than 20-acre units are penalized.

Clay County ranks second to Montague County in volume of deep lime prospecting. Bridwell Oil Company's Halsell 4-A, south outpost for the Halsell pool, proved to be the first failure in plugging at 6042 feet. Bend lime was recorded at 5430 feet, and Ellenburger at 6020 feet. Continental Oil Company et al's O. O. Ross 1, offset to the 2 Bend lime producers in the Jolly pool, logged oil saturation at 4860-68 feet with water indicated in core at 4868-78 feet, being the equivalent to the Halsell pool oil zone. It will continue to the 5400-foot pay. L. T. Burns et al's Tom Watson 1, near south end of county, proved dry in the Strawn series, and was drilling below 4840 feet on a 5200-foot contract. Franklin Drilling Company and W. B. Omohundro's Staggs 1, wildcat 3½ miles south of Petrolia shallow production, entered the Bend at 4840 feet, and was drilling at 5135 feet. John Farrell et al's Malone 1, formerly abandoned at 5552 feet, was cleaning out near bottom to deepen to the Ordovician. E. C. Norwood et al's Hapgood 1, projected 6000-foot wildcat, was drilling at 2100 feet. King Oil Company purchased one-fourth interest in the project. Walter Gant et al's Edwards 1, workover 6 miles east of Henrietta, plugged back from Ellenburger at 5990-6254 feet to 5919 feet, and was awaiting acid treatment. This wildcat recently bailed 5 barrels 39-gravity oil and 1 barrel drilling mud after perforating pipe with 60 shots at 5880-5913 feet, opposite Bend saturation.

K-M-A

Preliminary tests given 2 prospective producers at K-M-A from the Ellenburger proved somewhat disappointing. Magnolia Petroleum Company's Thom 3, 1¾ miles southeast of the single deep pay well, pumped 38 barrels oil and 46 barrels water on the last

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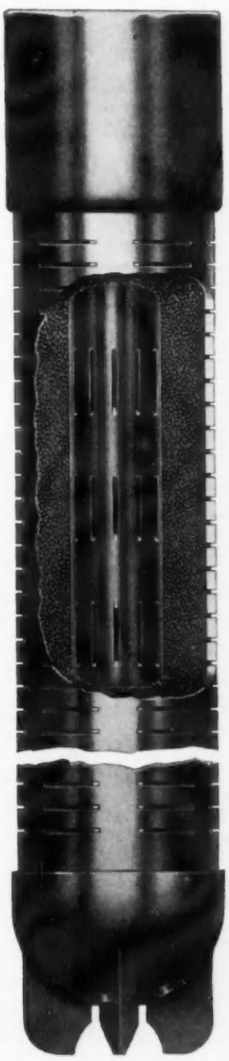

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12-hour test after deepening to 4427 feet. Workover operations failed to exclude the water, which is closely related to the thin oil pay section. Consolidated Oil Company's Barnes 1-K, SE NE SW H&TC Section 11, Block 7, situated northwest of the regular Strawn area and 4¾ miles northwest of the Ellenburger discovery, tested dry in slightly saturated lime at 4335-4370 feet with 7-inch pipe on top of Ellenburger at 4334 feet, and deepened to 4395 feet. It will probably be acidized. The latter is about level with the discovery on subsea, while Thom 3 is 87 feet low on the Ordovician marker.

Effective June 1, the K-M-A field's 35,160-barrel daily is allocated on a basis of acreage, per well and bottomhole pressure. The latter factor was introduced as a means of curbing underproduction. The new schedule lists 1326 wells wtih an aggregate of 18,237 producing acres, based on 20-acre units and fractional units. The well allowable ranges from 20-barrel marginal to a maximum of 31 barrels daily.

Gulf Oil Corporation's P. Siegel 18, west edge of the Hull-Silk deep area, Archer County, cored the upper Strawn sand at 3720½-30 feet to become the shallowest in the field. The oil string, 5½-inch, was cemented in 11 days after spudding. Plugs were drliled last midweek, then additional cores showed solid sand continued to 3751 feet, making 30½-foot body. Three oil zones are on production in this sector, making it possible for triple locations if desired. The lime zone near the 3900-foot level responds to acid treatment with flowing production, while the 4300-foot sandy-lime usually registers large potentials.

Southwest Texas

Colorado County Wilcox Well Capable of 10,000 Barrels

South Texas drilling activity showed one of the most spectacular spurts in several years during the past two weeks. The area received 207 new locations during the 14-day period, a number of these being in the wildcat category. This intensive program is in line with the district's revived exploratory campaign which has resulted in a series of new strikes. These strikes have tended to materially expand present trends of play.

A final completion in Shell Oil Company's Plow Realty Company 1 at Sheridan in Colorado County has definitely established the first oil production in the Wilcox zone in South Texas Gulf Coastal trend. It is heralded as the most outstanding strike in years in this sector. As well as expanding the trend more than 100 miles southwest, it indicates that this lower region will receive a continued deep wildcatting campaign on its higher relief type of structures.

On one gauge, the Colorado County well flowed 237 barrels of 35.4-gravity green oil in 24 hours through a ⅛-inch choke with 1350 pounds tubing and 2550 pounds casing pressure. Another gauge made through ¼-inch choke rated the well at 359 barrels in 12 hours with 1350 pounds tubing and 2140 pounds casing pressure. Gas/oil ratio was 1200 to 1. While the tests were underway, the tubing became clogged and after the mechanical difficulties were adjusted, the well was again placed on production, its latest flow being cut to 6/64-inch choke with 2100 pounds tubing and 2800 pounds casing pressures. Production is from perforations at 8135-43 feet, the sand being reported at 8121-60 feet and the bottom of the hole 8339 feet. The openflow valuation on the well has been variously reported up to 10,000 barrels per day. This is considered as conservative, as increases in production are noted with the increase in sizes of choke. At the same time, the gas volume has been kept at a nominal level.

Lolita, Jackson County discovery, was definitely widened 7000 feet westward with completion of a second oil producer. Barnsdall Oil Company's Lazarus 1, second test in the field, flowed 156 barrels of oil per day through 7/64-inch choke under 850 pounds tubing and 975 pounds casing pressure after perforations had been made at 5924-29 feet. The well paves the way to an immediate development program. Magnolia Petroleum Company staked two definite locations, Wellington Oil Company 1, and four others were spotted, the definite announcements expected immediately.

In Victoria County, Colton & Colton's Terrell 1, discovery of the Terrell pool, dropped to about 35 barrels per day through 3/16-inch choke, but this was believed to be due to mechanical difficulties. The screen was pulled and the well was being reworked. It is the first Vicksburg sand field in the county.

Norsworthy Production Company's Holeman 1, 1 mile northeast of the Fagan field, Refugio County, plugged back from 6509 feet after failing in the lower sands and was completed as a gas well through perforations at 2108-2118 feet. It opens a new sand for the area.

Coronado Corporation resumed testing in its deep prospect south of Seadrift, in Calhoun County. Casing was reperforated at 8743-87 feet.

Jim Wells County apparently scored two oil strikes, both in the Frio zone. These are a follow-up to the Orange Grove discovery and vital extensions to the Wade City field effected during the past several weeks.

M. M. Miller and Sons' Gallagher 1, 4 miles southeast of Sandia, was waiting on cement after plugging back from 5624 feet to 5247 feet and setting casing at that level. It will be completed in sand section between 5189-5215 feet where drill-stem test indicated production. It is in the Casa Blanca grant.

H. H. Howell's San Antonio Joint Stock Land Bank, in the Lopez grant, 5 miles south of Bentonville and 466 feet due east of the Nueces County line in Jim Wells County, had run casing to about 5700 feet after drilling to 6547 feet, running electric log and taking side-wall samples. A saturated sand was found at 5645-60 feet.

Jim Hogg County had a new field discovery in Daubert & Achning's Wood 1, 1 mile west of the Randado field, which is in Pettus sand at 2603-13 feet. Casing was landed at 26061/2 feet and the hole is bottomed at 2614 feet. Plugs had been drilled and the well was in final stages of completion at the end of the week.

Bridwell Oil Company's apparent discovery of a new Pettus-sand field in Duval County, 3 miles southwest of the Fitzsimmons area, was reportedly flowing at the rate of 150 barrels per day through small choke. Other reports are that it was still testing and not yet completed. The test is in sand at 4321-27 feet. Location is in the north corner of Survey 21.

LaSalle County Wilcox Test Shows Oil With Gas Blow

H. R. Cullen et al's Washburn Ranch 1, in eastern LaSalle County, encountered a Wilcox sand around 5400 feet, or 1800 feet below the top of that formation. On a drill-stem test, it is reported that the well gave up 125 feet of high-gravity light green oil, 240 feet of mud and fresh water, a good gas blow and little pressure in about 25 minutes. It was going ahead below 5700 feet. This well is drilled as a closed proposition, hence all information is approximate.

New Field in Starr

Sun Oil Company was adding a new oil field in Starr County, the wildcat being Lehr 1, Section 513, 8 miles southwest of the Sun field and on trend with the Rincon area. The test was on pump after perforations were made at 4127-37 feet with 50 shots. It had swabbed about 50 barrels per day, 95 percent oil and the rest water.

Denzil Oil Company (Glen Harroun) apparently has established crude production northwest of the Ricaby pool in an area where several gas wells have been drilled. Seabury 1, Block 6, Share 46, Portion 80, was pumping an estimated 20 barrels per day of 22-gravity oil in sand at 1341-46 feet. The well is on a structure core drilled by Sun Oil Company.

Bastrop County Apparently Has Edwards Limestone Strike

The first Balcones fault zone Edwards limestone strike in years was apparent as W. C. McGlothin was ready to complete Bell 1, 2 miles west of Sayersville in Bastrop County. The test, located in Survey 35, was bottomed at 3154 feet with casing landed at 3145 feet. The well topped the Edwards limestone between 3135-38 feet and in a series of cores to the total depth found good oil showings. The well topped the Austin chalk at 2780 feet, had a very thin section faulting out the Eagleford and going into the Buda limestone at 2902 feet. Georgetown was topped at 3017 feet. The well was drilled in the area where several preceding tests have been sunk to the Edwards limestone. This originally was a Gulf Oil Corporation prospect and has been mapped as a high powered structure. Major faulting with several hundred feet of displacement was proved and with a closer of consequence, a field is possible.

A small producing spot in the Dale

limestone may result from Kean & Williamson's Rector 1, Roberts Survey, 5 miles northeast of Lockhart. The well is testing at 1892 feet, casing having been set at 1732 feet.

George R. Boyle's Standard Trust Company 1, 3 miles east of the Barbacoas field, placed another Starr County prospect in the producing columns. While not yet gauged, it was flowing at the rate of 100 barrels of 46.3-gravity crude per day through 7/64-inch choke in 1000 pounds tubing and 1475 pounds casing pressures. The well is producing from perforations at 3491-98 feet, where 20 shots had been made in casing set through the Frio sand. The well is 1200 feet northeast of Cice et al's Carruth 1, drilled several years ago, and which found several gas showings. The test is in Share 1-B.

Texas Gulf Coast

Wilson Creek Test Recovers Oil; Operations Increase

Volume of Texas Gulf Coast completions during May was only 4.4 percent under that of May, 1939. This improvement over previous months brought cumulative completions for 1940 to within 13.1 percent of those for the same period of 1939. The 129 completions registered in May represent a 25 percent increase over the April pace, and contrast even more sharply with the 89 and 92 finished operations for February and March. Uncompleted operations, more numerous in 1940, failed to increase sharply as they did at this time last year; the margin dwindling from 11.8 to 0.7 percent during the month.

Barnsdall Oil Company's Stoddard 1, wildcat on the Wilson Creek prospect, southern Matagorda County, found the first oil for the one-well field, which previously had produced only gas and 52-gravity distillate. The well blew several million cubic feet of gas and 350 barrels of 40-gravity oil daily from 10,295 feet through 4-inch drill pipe for two days, then bridged, giving operators a chance to install high-pressure head and fish junk from the hole. Some features of the strike are identical with those of Stanolind Oil & Gas Company's Hulen 1, two-week-old discovery at Alta Loma, Galveston County, as there were two blowouts; the first resulting in stuck drill pipe, the second bringing the well in as operators attempted to cut and recover pipe. The well logged at 9614-19 feet the Frio gas sand which produces in United North & South Development Company's Stoddard 1-A, 1700 feet southeast of the Barnsdall well, but logged this sand 350 feet higher on the structure. Apparently a deep seated salt dome, the structure was discovered by reflection seismograph in checking the Buckeye structure, a producing dome two miles east of Wilson Creek. Major leaseholders are Barnsdall Oil Company and United North & South Development Company, whose well averaged 43 barrels of distillate daily during 1939. Loffland Brothers drilled the Barnsdall Oil Company well.

Two other Gulf Coast wildcats promised immediate success. Richardson and Christian - Carpenter Drilling Company's E. Marks 1, in the Ogburn Survey, northwest Harris County, ran casing for completion, which will probably be in sand at 6614-21 feet. A 10-minute drill-stem test of this zone recovered 300 feet of oil-cut mud and free 37-gravity green oil through ¼-inch chokes under 3000 pounds bottom-hole pressure. There is possibility that perforations will also be made at 6943-48 feet, where a 35-minute drill-stem test recovered 6400 feet of salt water and oil. A drill-stem test at 6799-6811 feet recovered 18 stands of gas and salt water, another at 6449-6447 feet recovered 25 stands of mud and free oil under 80 pounds pressure. The wildcat topped Heterostegina at 2940 feet, Hockleyensis at 5322 feet, and Cockfield at 6229 feet.

In the Double Gum area, Liberty County, Titanic Oil Company and Marrs McLean swabbed oil from 8845 feet in Boyt 1, a side-tracked hole. Operators perforated at 8570-8606 feet in the original hole and recovered oil and water on a drill-stem test. Collapse of the lower screen forced sidetracking and redrilling to 9310 feet, where tests were unsuccessful. The well was plugged back to 8845 feet. George Echols is contracting this test, 5 miles east of Hankamer. Discorbis was topped at 5871 feet, Heterostegina at 6213 feet, Marginulina at 6639 feet, Frio at 7072 feet.

Brazoria County

Glen McCarthy's Munson 1, closely watched wildcat in the Bailey's Prairie area, Brazoria County, was drilling at 11,300 feet. Rowan & Nichols' Hubbard 1, North Liverpool area wildcat, was coring at 9550 feet, with production from some level practically assured. Drill-stem test at 9107-34 feet recovered 135 feet of white 51-gravity distillate and mud in 9 minutes, using ¼-inch choke at bottom and ⅛-inch choke at top, under 500 pounds pressure. Oil and gas distillate sands were cored at 8108-10 feet, 9094-9103 feet, and 9107-34 feet. Salt-water sand was cored at 8117-21 feet. Heterostegina was topped at 7200 feet, round Marginulina at 7380 feet, flat Marginulina at 7500 feet, Frio at 8100 feet.

Other wildcats currently assigned the best chances of producing were David B. McDaniels' Baldwin 1, Tamina area, Montgomery County, cleaning oil and mud from 90 perforations at 9390-9400 feet after encountering Cockfield at 5833 feet, and Wilcox at 9220 feet; and Shell Oil Company's Coline Oil Company 1, Cold Spring area, drilling at 8690 feet in shale. Jack Frazier is contractor on the latter test, which flowed 1200 feet of oil and water on drill-stem test at 7806-16 feet and may still be completed in this zone if cores from the lower Wilcox do not carry oil. In the Shepherd area, southeastern San Jacinto County, Harrison & Abercrombie's Dixon 1, Housh & Thompson, contractor, was drilling in sandy shale

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at 8515 feet. This test is reportedly checking 100 feet low on structure.

Continental Oil Company's Bender Estate 1, on Spring prospect, southeastern Montgomery County, waited on cement after plugging back from 11,193 to 10,481 feet. This wildcat attracted attention when operators landed 9⅝-inch casing at 10,493 feet, although there was no report on possibilities. Hockleyensis was topped at 5179 feet, Nonensis Cockfield at 6056 feet and Discorbis Yegua at 6243 feet.

Wildcat activity elsewhere was routine. In Burleson County, H. Y. Barrett's Fink 1, J. S. Cox No. 15 Survey, was drilling at 1550 feet. In Calhoun County, Ranger and Wynn Crosby's Sells 1, Olivia area, was coring below 7000 feet. In Fort Bend County, Superior Oil Corporation of Oklahoma's George 2, Smithers Lake attempt, was drilling at 1900 feet after setting 10¾-inch surface casing at 1816 feet. Bill Bowles was moving in materials for R. F. Garland's Hamburger 1, Glen Flora wildcat in Wharton County.

Galveston Strike 60 Percent Water

In Galveston County, Stanolind Oil & Gas Company's Hulen 1, discovery at Alta Loma, continued to hold up on fluid production, gauging 783 barrels daily, but salt-water content of the fluid increased to 60 percent. This well has produced 37,500 barrels of 36-gravity oil in two weeks, the oil moving through a 6-inch pipe line to Texas City. Rumor persists that Salt Dome Oil Corporation has staked Lobit 1, ½ mile north of the discovery, and that Stanolind Oil & Gas Company has staked Hulen 2, although both companies deny this. Trading in the area has been slow due to the high prices demanded by land and lease owners. One parcel of land 1½ miles from the well was turned for $150 per acre, plus $250 per acre in oil.

Standard Oil Company of Texas and Salt Dome Oil Corporation have temporarily abandoned State 61, Tract 54, wildcat on Fishers Reef, Trinity Bay. This well, once touted as a field opener when 30 feet of partial saturation was cored in the Hackberry zone of the Lower Frio near 9300 feet, failed to respond to a series of tests. Rig has been moved to rework another well. Operators have filed for a war department permit to do seismograph work in Trinity Bay in the vicinity of Fishers Reef.

Humble Oil & Refining Company's State 1, wildcat on Red Fish Reef, Galveston Bay, was drilling at 8218 feet. The company's Barrow 1, wildcat south of South Cotton Lake field, was drilling at 8556 feet. This operator was setting pipe for a production test in Mettler 2, northeast outpost in Angleton field, Brazoria County, which had been reamed to bottom at 10,501 feet. Oil shows were logged at 10,491-10,501 feet, and gas distillate shows in several zones up the hole. Mettler 2 is between the field proper and Mettler 1, long northeast extension recently completed by Humble Oil & Refining Company. Same operators are drilling at 6250 feet in Bassett Blakely 3, northwest outpost at Danbury, Brazoria County.

In Harris County, John May and Christian-Carpenter Drilling Company's Josey Farms 1, Cypress area wildcat, was drilling at 6470 feet in Cockfield topped at 5980 feet. W. M. Hobson's Allen 1, northeast outpost for the North Houston field, was drilling at 3000 feet. In Matagorda County, Stanolind Oil & Gas Company and Amerada Petroleum Company's General American Life 1, a mile north of Wadsworth, was waiting on orders at 10,840 feet, past contract depth. The Texas Company's Pierce 1, Blessing area, was drilling at 8300 feet. The company's Taylor 2, Sugar Valley wildcat, was drilling at 2890 feet.

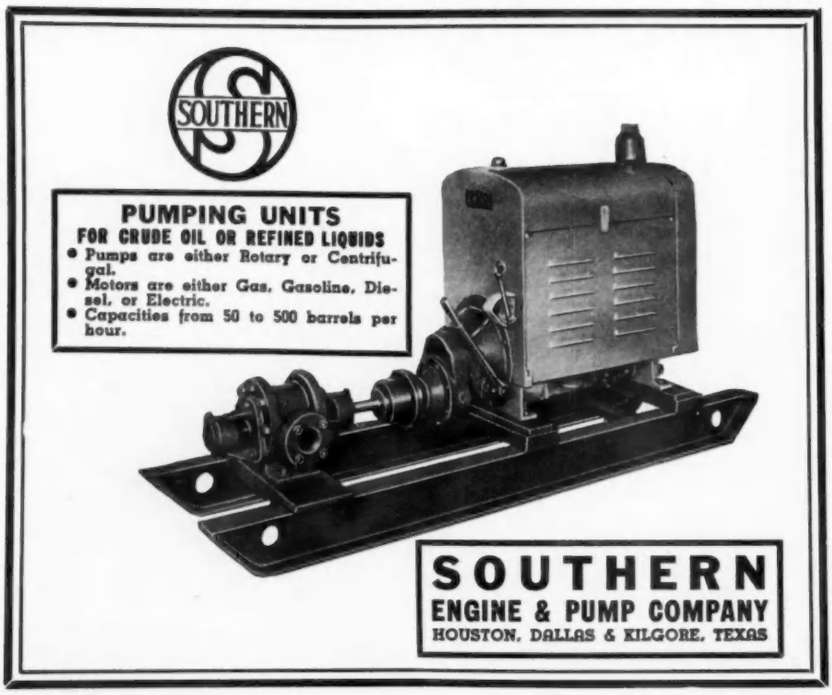
Gulf Oil Corporation extended North Thompson field Vicksburg pay across the Brazos River by completing Scanlan 1, east outpost drilled by Loffland Brothers. The well, first east of the Brazos, is flowing an estimated 295 barrels of oil daily into tanks from perforations at 7883-94 feet. Oil string was set at 7901 feet, with bottom at 7902 feet. Loffland Brothers are drilling in the river southwest of the Scanlan outpost.

General Crude Oil Company is attempting to open deep production on the north flank of Esperson Dome, Liberty County, with Davis 20, in the Kokernut Survey. The well was drilled to 9731 feet and plugged to 7050 feet, where casing has been landed. A test will be made on the sand at this point, from which the operator's Davis 9 blew out and caught fire recently.

E. J. Deupree, Dallas, abandoned Texas Long Leaf Lumber Company 1, wildcat in the Millsaps Survey of Walker County, at 3398 feet after failure to recover 1600 feet of stuck drill stem. Rig was skidded 250 feet for Texas Long Leaf Lumber Company 2, which has drilled out of surface casing at 1600 feet. The first test was credited with shows of oil at 2500 and 3100 feet. Elmer Hay's Starr-Pope Estate 1, wildcat 2 miles southeast of Lovelady in the J. Forbes Survey, was waiting on materials at 2132 feet. Ten miles southwest of Crockett, G. C. Dixon's Crowson 1, wildcat in Cheairs Survey, was coring Carrizo below 2075 feet.

Wildcat abandonments were numerous. In Fort Bend County, Fabriguez & Sacks abandoned location for George 1, Bolley Survey. In Grimes County, E. R. Cokers left Freund Estate 1, O'Connor Survey, Carlos area, at 2939 feet. Eura B. Oil Company abandoned Traylor 1, on the Green Lake prospect, Calhoun County, at 7507 feet. General Crude Oil Company and Welch left Kirby 1, on the west side of South Esperson, Liberty County, at 7498 feet.

Geophysical activity in the Texas Gulf district is plentiful and well scattered. In Austin County, The Texas Company has a seismograph crew working Block 202, Moore Survey, northwest of Wallis. In Brazoria County, Stanolind Oil & Gas Company has a seismograph crew working the Hall and Marsh Surveys in the Chenango area, while Humble Oil & Refining Company has an Eltran crew at work. In Fort Bend County, Shell Oil Company is working Section 39 of the H&TC Survey with seismograph. Phillips Petroleum Company is doing seismograph work east of Navasota in Grimes County, in the Wingfield and Stevens Surveys, while Amerada Petroleum Corporation is using seismograph in the Moore, Jackson and Wallace Surveys, southeast of Navasota. Continental Oil Company is doing reflection work in Herring Survey, Harris County, west of Spring. In Jefferson County, Shell Oil Company has a seismograph crew in the Lovell's Lake field. Tide Water Associated Oil Company is working all roads in Brazoria County with magnetometer. Atlantic Refining Company has a magnetometer in the western half of Montgomery County, and also a seismograph crew in Sections 3 and 5, BBB&C Survey, Tyler County. Humble Oil & Refining Company has a magnetometer in Tyler County. The Texas Company has reflection seismograph crew in Sugar Valley, Matagorda County, and a crew in the Bennett Survey, south of Waller, in Waller County. Continental Oil Company is working the J. Devers Survey, west of Louise, in Wharton County, with reflection seismograph.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Louisiana Gulf Coast

Operations Continue Brisk As 12,000-Foot Field Is Indicated

South Louisiana operations continued at a brisk pace during May; the 98 completions registered during the month comparing with the 103 completions made in April, and contrasting with the 38 and 73 operations completed in April and May of 1939. Cumulative completions for the first five months of 1940 are now 72.3 percent greater than those for the same period the year previous, with a slight suggestion that this excess will continue to increase in the fact that active uncompleted operations rose to 151 during the month. The Eola field, Avoyelles Parish, has been the greatest single contributor to this record, last week receiving its 78th well and several new locations.

A new 12,000-foot field appeared in the offing, as Gulf Refining Company prepared for a production test in Bowie Lumber Company B-1, Lake Boeuf area wildcat in Lafourche Parish. With bottom at 12,512 feet, this well is the deepest now drilling in the state, and only 900 feet shallower than Fohs Oil Company's Bay Baptiste 13,409-foot test, the deepest well in the state and second deepest in the world. Five and one-half inch liner has been run from 8086 feet to 12,507 feet, and cemented. Plug was drilled to 12,282 feet and perforations will be made for production tests at 11,988-12,010 feet and at 12,018-044 feet. These zones registered porosity on electric log, although cores taken yielded reportedly poor showings. The company is no stranger to deep-well drilling, having completed two wells deeper than 12,000 feet in the Grandison area last year.

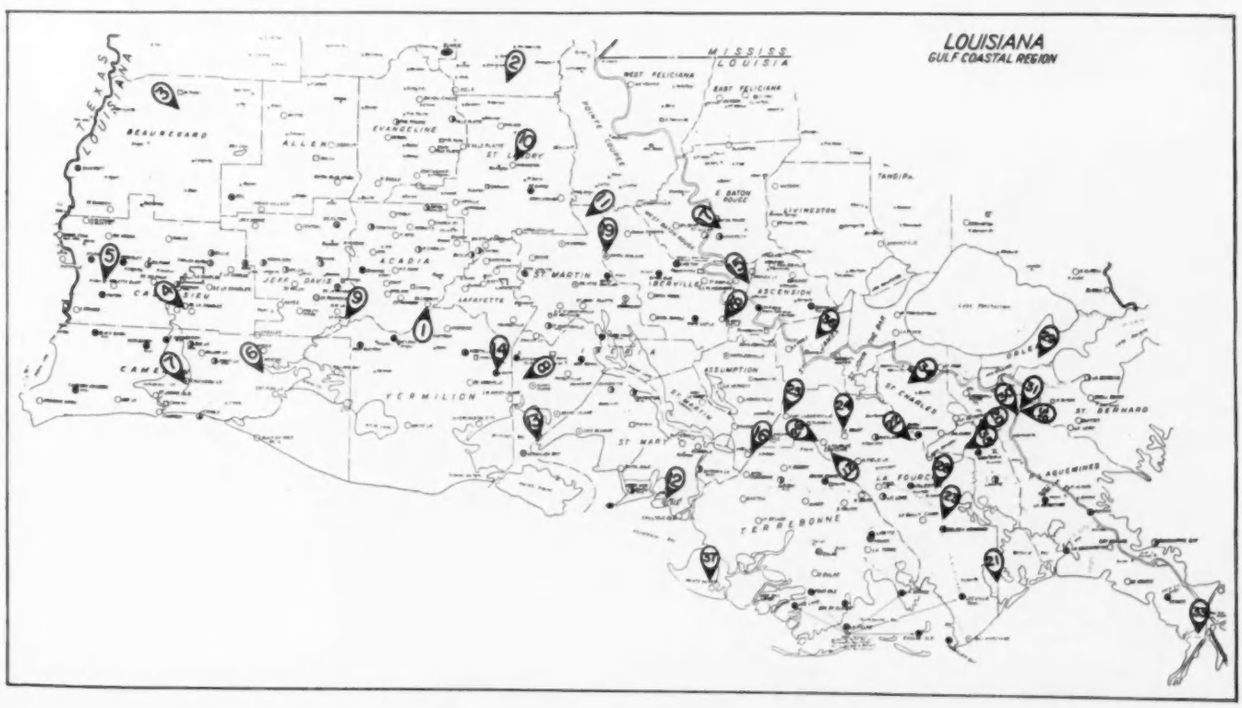
Republic Production Company established a new sand for the Bancroft field, Beauregard Parish, by completing Lutcher-Moore Lumber Company 11 for 50 barrels daily, flowing through perforations at 7480-88 feet. The completion also constitutes a 600-foot northeast extension. Previous production in the field, which was discovered by the company, has been from 7320 feet. Several surrounding tests have gone to the deeper Wilcox with no success. The sand in which the outpost was completed was found in operator's Lutcher-Moore 1, but produced only gas and distillate. Operator's Columbia Land & Timber Company was waiting on rig.

Eola Extension Attempt

Sid Richardson, discoverer of the Eola field, was attracting attention with Haas Investment Company 1-B, north extension attempt to this Avoyelles Parish field. This important semi-wildcat was drilling at 9400 feet, 400 feet past the productive level in the field. If a new sand is found, Eola will have a potential capacity exceeded only by the

Key to Drilling Indicated on Map Below

No.	Company	Farm	Area	Location	Depth	Status
1	Humble	Atkinson 1	S. Crowley	26-10s-1e	8792	Dlg.
2	W. C. Brock	Snowden 1		22-3n-5e		Lcn.
3	Danciger	Le Roy 1	De Ridder	2-3s-9w	2600	Dlg.
4	W. T. Burton	Mayo Realty 1	S. Lake Charles	1-11s-8w		Lcn.
5	M. H. Hannah	Reed 1	Vinton	18-10s-12w		Spdg.
6	Phillips	Miami Corp. 1	Grand Chenier	11-14s-6w	10,656	Dlg.
7	Superior	State 3	Calcasieu Lake	1-14s-9w	5546	Dlg.
8	I. Delcambre	Renaud 1	Delcambre	17-13s-5e	805	Sd.
9	H. M. Naylor	Acadia Dev. 1	W. Mermentau	12-10s-2w	9700	Swbg.
10	Stanley Thompson	Murphy 1	Port Barre	25-5s-6e	7749	D&A.
11	Shell	Schwing 1	Happytown	85-7s-8e	10,665	Dlg.
12	Sun	Belle Isle 1	Belle Isle	6-18s-11e	6332	Dlg.
13	The Texas	State 2	W. Cote Blanche	20-15s-6e	7980	Dlg.
14	Strake	Caldwell 1	Erath	41-13-4e	10,045	Fshg.
15	Shell	Southwood Plant 1	St. Gabriel	20-9s-2e	10,090	D&A.
16	Shell	Tatteran 1	Amelia	66-16s-4e	5885	Dlg.
17	Golding & Farris	Paulet 1	McInnis	57-7s-1e	6838	D&A.
18	Falcon-Seaboard	Folse 1	Samstown	42-11s-13e	220	Spdg.
19	Humble	Wilberts B-3	Bayou Alabama	78-8s-8e		RU.
20	Vendome	Whitney-Coulon 1	Crown Point	15-15s-23e	10,132	Dlg.
21	Shell	State 1	Bay Des Islettes	27-20s-24e		MIM.
22	Amerada	Gheens 4	Bayou Des Allemands	13-15s-20e	2285	Dlg.
23	E. Cockrell	La Fourche 1	Scully Dome	32-18s-22e	2962	Dlg.
24	Gulf	Bowie 1-B	Lake Bouef	69-15s-18e	12,507	Tstg.
25	Humble	Sugars 1	Thibodeaux	115-14w-15e	12,310	Dlg.
26	Lisbon-Iberia	Bergeron 1	La Fourche	132-15s-17e		RU.
27	Lisbon-Iberia	Thibodeaux 1	La Fourche	17-15s-17e	9252	Dlg.
28	Tide Water	Delta Farms 2	Delta Farms	1-17s-22e		Lcn.
29	W. T. Burton	State 3	Lake Catherine	5100 ft. NW L&N 1		MIM.
30	California	Delta Min.1, Ls. 7	Stella	2-15s-24e	10,254	Rwkg.
31	California	Delta Min.1, Ls. 5	Stella	2-15s-24e		MID.
32	California	Delta Min.1, Ls. 11	Stella	2-15s-24e		Lcn.
33	Gulf	Buras Levee 1	West Bay	1-23s-30e	9289	Dlg.
34	R. H. Parker	Thompson 1	Boutte	87-13s-20e	11,160	D&A.
35	Texas	State 1	Lake Salvador	26-16s-22e		Lcn.
36	Acadian	Celestine 1		18-11s-4e	1345	Dlg.
37	Barnsdall	Nelson 1	Point Au Fer	2-21s-11e	11,731	D&A.



Continental Oil Company's Ville Platte field, in Evangeline Parish. Richardson's well had Cane River 7850-80 feet and Cane River fossil zone at 8425-35 feet.

Atlantic Refining Company was running casing for completion of Spiers 1, second test in the Neale field, Beauregard Parish, ¼-mile southwest of the discovery, the company's Whitmer 1, Section 26-3s-11w, which produced initially 20 barrels of 35-gravity oil daily from Wilcox at 8369 feet. The Spiers test bottomed at 8440 feet. Same company's Musser-Davis 1 was drilling at 4400 feet. Bayport Oil Company staked Musser-Davis 1-A, Section 30-3s-10w, for a southeast extension attempt. This operator, new in the field, has taken acreage southeast of Atlantic Refining Company land for which it paid $25 per acre and placed $15,000 in escrow against a 90-day drilling commitment. Strake Petroleum Company has also acquired Rice Lumber Company acreage in the area at $25 per acre, and $8,000 in escrow against a 1-year drilling commitment. Atlantic Refining Company has taken 4000 acres of Rice Lumber Company land in the Singer area.

The Texas Company's shallow sand discovery in LL&E-LaFitte 15 has proven incapable of sustained production. The well has been recompleted for 289 barrels daily through perforations at 9955-70 feet, ¼-inch choke, after squeezing perforations at 4805-10 feet.

Union Sulphur Company confirmed the new 6200-foot sand at Sulphur Mines, Calcasieu Parish, with Fee 868, which flowed 315 barrels daily through 12/64-inch choke. In Plaquemines Parish, The California Company was having considerable difficulty completing Delta Mineral 1, Lease 7, discovery in the Belle Chasse, or Stella field, 8½ miles southeast of New Orleans. The wildcat was drilling plug at 9961 feet and will perforate at 9953-65 feet for another test. The company's Delta Minerals 1, Lease 5, ½-mile northeast of the discovery, was drilling at 1086 feet.

Fohs Oil Company's purchase of a 95-acre lease in Section 36-11s-1w, Vermilion Parish, at a $2000 bonus and $2000 rental leads to the belief that a flank test in the old Gueydan field will be attempted. Magnolia Petroleum Company's Benoist 1, south outpost in the West Gueydan field, was abandoned at 7333 feet. The field is now defined on every side but the southeast. Half of the 10 wells drilled here since discovery in 1938 have been dry holes.

Sun Oil Company apparently has its second well in the new shallow sand at Fausse Point, Iberia Parish, as casing was landed at 1204 feet in Kling & Walet 2. The sand was found at 1105-50 feet in the company's Kling & Walet 1, on top of the dome. Plymouth Oil Company was dredging canal for LeBlanc 1, third test in the Bayou Pigeon field, 750 feet east of the discovery.

Amerada Petroleum Corporation's State 10, Grand Lake field, Cameron Parish, flowed 450 barrels daily through ¼-inch choke from perforations at 8930-40 feet. Regular horizon is 8400 feet.

Wheelock & Collins abandoned Rushing 1, Whittington area wildcat, Rapides Parish, at 6500 feet. Test topped Cockfield at 3818 feet, found base at 4462 feet, topped Sparta at 4810 feet, and found base at 5413 feet. Wilcox was topped at 5828 feet. Gulf States Exploration Company's Long Bell Lumber Company 1, Hot Wells wildcat, was rigged up and waiting on fuel.

Wildcat abandonments include Paulet 1, Golding & Farris' test on the McInnis prospect, East Baton Rouge Parish, Section 57-7s-1e, quit at 6838 feet; R. H. Parker's Thompson 1, Boutte area, St. Charles Parish, Section 87-13s-20e, left at 11,160 feet; Stanley Thompson's Murphy 1, Port Barre area, St. Landry Parish, Section 25-5s-6e, abandoned at 7749 feet, and Barnsdall Oil Company's Nelson Development Company 1, Point Au Fer Island, Terrebonne Parish, left at 11,700 feet.

A new sand for the English Bayou-Gillis field, Calcasieu Parish, was found in Union Sulphur Company's Kaufman 9, which gauged 298 barrels daily through 13/64-inch choke from 7600 feet. All other wells in the field have been completed in a 6998-7010 foot horizon.

Humble Oil & Refining Company's Caldwell Sugrars 1, East Labadieville wildcat in LaFourche Parish, was drilling near 12,500 feet, a few feet shy of the current active wildcat record held by Gulf Oil Corporation's Bowie Lumber Company 1-B, Lake Boeuf area, same parish. While operators on these wells have not announced their probable ultimate depth, they are both being closely watched as possible Gulf Coast record-breakers. Humble Oil & Refining Company's test has reported no showings.

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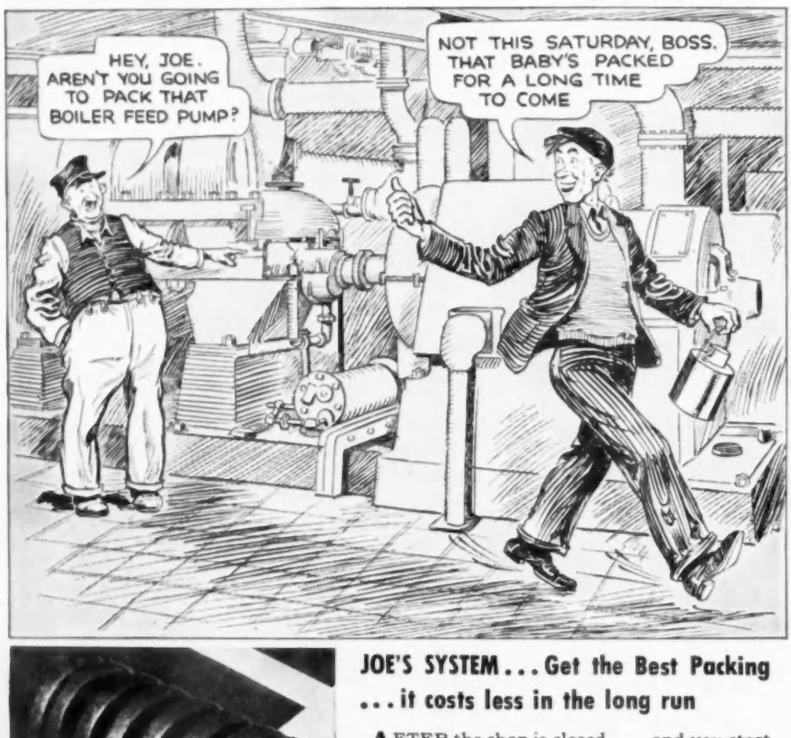

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North Louisiana

Haynesville Deep Test Drills On After Oil Show

Although an oil show was logged in Ohio Oil Company's G. W. Taylor 15, Account 1, SE SE 15-23n-8w, deep test in the shallow Haynesville field, Claiborne Parish, in basal Glen Rose lime below the anhydrite, a drill-stem test at that level showed only four fourbles of mud and a slight oil showing. It was deepening below 5445 feet toward its goal of 10,000 feet. Nine feet of recovery was reported in a core at 5214-5226 feet, the recovery consisting of hard, tight sand with some oil stains, and another core at 5226-31 feet had 2½ feet of recovery, with the top 6 inches being soft, porous lime with oil saturation, the remainder being black, sandy shale. Top of the lime was placed at 5206 feet.

A 40-acre space rule has been placed in effect for the shallow Olla oil field, LaSalle Parish, and tentative per well allowable has been placed at 160 barrels daily.

H. L. Hunt, discoverer of the Olla field, made location for another offset to a 2-mile south extension gas well, recently completed in the Wilcox. The new test is Louisiana Central Lumber Company 19, C NE NW 36-10n-2e.

Two wildcats were abandoned, one in Grant Parish and the other in West Carroll Parish.

In the Waskom field, Harrison County, Texas, Natural Gas Drilling Company (H. H. Alvord) assigned 349 acres in the James Shandoin, A. B. Stroud and Carey McClure Surveys to N. P. Hutchinson.

Louisiana Permits

Nineteen drilling permits were issued last week by the Louisiana Conservation Commission, of which ten were in North Louisiana, divided among the following parishes: Bossier, 1; Caddo, 5; and La Salle, 4. The nine in South Louisiana were in the following parishes: Avoyelles, 1; Iberville, 1; Plaquemines, 2; St. Mary, 3; Terrebonne, 1; and Vermilion, 1.

Arkansas

Wildcats Show for Pool Openers

Two tests in South Arkansas held chief interest. Both are wildcats on geophysical prospects.

In LaFayette County, Atlantic Refining Company's Bodcaw Lumber Company 1, C NE SW 29-17-23, after drilling to the water level at 9221 feet, ran electric log and was running final string of 5½-inch casing to bottom. A tank battery was built, and tubing was being moved in for a production test. With elevation of 273 feet, this test topped Smackover lime at 8995 feet, oolitic lime at 9102 feet, and established water level at 9207 feet. The gas/oil contact was at 9122 feet. Electric log revealed the best oil saturation at 9123-28 feet, with good porosity and resistivity from top of the oolitic lime to the water level.

After drilling to 9550 feet, Standard Oil Company of Louisiana's Sturgis 1, C NE SW 1-17-27, Miller County, plugged back to 4012 feet to test the Paluxy horizon, which in formation tests during drilling had shown for an oil well. The Smackover lime had poor permeability, although pin points of oil were logged at several places in the deep lime. Casing was perforated for a test in the Paluxy at 3850-54 feet.

A showing of oil at top of the Graves sand, one of the shallow producing horizons in the old Smackover field, was reported at J. & J. Oil Company's Barnes 1, SE SE 4-16-24, 3 miles north of production in the Lewisville-Stamps field, LaFayette County. This test topped Graves at 2134 feet, and was coring ahead.

Arkansas Permits

Two drilling permits were issued last week by the Arkansas Oil and Gas Commission, as follows: Arkansas County—C. W. Robinson et al's E. P. Fox 1, C SE 23-5s-3w; Sevier County—Gramp Oil Company's Floyd Phillips 1, NW NW 35-9s-30w.

Ask Boost for Cotton Lake

Texas Progress Oil Company has asked for a 16-barrel increase in the allowable for wells in the Cotton Lake field, Chambers County, now allotted 31 barrels daily.

George F. Novak, production superintendent for the company, said that this increase was requested to place this field on a parity with South Cotton Lake, where wells now have an allowance of 47 barrels a day. He said the company has invested $675,000, and that 10 years will be required to pay out at the present rate of production. There are nine producing wells in the field.

Mississippi

Slight North Extension at Tinsley Dome Is Indicated

A slight extension north of Tinsley Dome, Yazoo County, appeared assured last week in Slick-Urschel Oil Company's Slick 6, SW SE 35-11n-3w, which set 7-inch casing after logging 17 feet of oil sand topped at 4800 feet; bottom is 4817 feet and elevation 152 feet.

Only one well was completed last week at Tinsley Dome. Four widely separated wildcats were abandoned in Hinds, Holmes, Scott and Wayne counties. A new wildcat, Ralph A. Johnston's Locke-School Board 1, NE NE 16-11n-3e, Madison County, was announced.

Exchange Oil Company abandoned Dixon 1, SW SW 29-12n-3e, in the Pickens field, Yazoo County, this being the first failure recorded against this area.

It is reported Gulf Refining Company is planning to drill a wildcat soon on the W. C. Brooks tract in Section 31-19n-7e, Montgomery County, where this company recently assembled a large block.

W. J. McCallahan is reported preparing to abandon his Mobile County, Alabama, wildcat at Bayou Labatre, at around 6300 feet in shale. In Marion County, Alabama, Seaboard Oil Company is skidding rig over for a new hole at Easton et al 1, SE SW 28-11s-14w, after drilling into a cavity around 700 feet. Union Producing Company is drilling to get back into old hole at McCorvey 1, SE SW 20-9n-2w, Choctaw County, Alabama, which was drilled to 9622 feet before a protective string of

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casing was set around 4000 feet. It was after drilling plug in this string that the bit got out of line.

In Mobile County, leasing is active in townships 5, 6 and 7 south, ranges 2, 3 and 4 west. In the northeast part of this county, Albert L. Deane is taking a block in township 2 north, range 1 west.

In Montgomery County, Georgia, Meadows and associates' Moses 3, has set 8-inch casing at 1880 feet, identified as top of the upper Cretaceous, after reported traces of oil and gas at 1100 feet, 1540 feet and in cores from 1755 to 1829 feet.

In Clinch County, Georgia, Georgia Resources' Gillican 1, Lot 200, land district 12, has drilled to 1375 feet, a core from 1332 to 1338 feet showing about equal amounts of white fossiliferous limestone and massive brown gypsum.

Rocky Mountain States

Operations Continue Uptrend As 125 Locations Are Active

Continued increase in Rocky Mountain drilling operations is seen with location of 2 additional wells in the Wyoming area during the past week and 4 in Montana, making a total of 125 active locations in the region at this time, including wildcats, proved field development and deepening jobs in old producers.

The Ohio Oil Company located Elizabeth Lamb 15 Account 1 in NW SE SE 32-36n-65w, within the proved producing pool of the Lance Creek field, Niobrara County, eastern Wyoming, and was running rig foundations. The company also has 3 wells ready for completion in the field.

Near completions for the Lance Creek area are Ohio Oil Company's Carrie Putnam 15, NW NE SW 33-36n-65w, which were cleaning out and testing at plugged depth of 5481 feet; Carrie Putnam 16, SW SW NW 4-35n-65w, which plugged back to 5450 feet from 5529 feet to shut off water and was waiting on cement to set; and Elizabeth Lamb 14 Account 2, CSW SE 5-35n-65w, which drilled to 5445 feet, set the 7-inch casing at 5443 feet through the Leo sand logged at 5368-5429 feet, and was preparing to perforate.

The other new location for the state was Mountain Fuel Supply Company's Florence Wilson 6, CNW SE 14-12n-100w, spotted in the Hiawatha field, on the Wyoming-Colorado state line in the western part of the state. Company has 2 other locations in the field, 1 of which, Florence Wilson 5, SW SW NW 23-12n-100w, was on test after perforating casing opposite the oil sands. Well reported about 200 barrels daily on test of the Third Wasatch sand through perforations at 2482-2522 feet. Each sand level in the well is being tested separately through use of packers to shut off lower horizon. Total depth is at 3565 feet.

Four new locations in Montana were all spotted in the Kevin-Sunburst field, Toole County, where a heavy increase in drilling activity has followed recent removal of market restrictions in the field, permitting capacity production from all wells. International Refining Company is taking all crude produced until further notice. Wells spotted were Black Laber's State 10, SW SE SE 16-35n-2w; Enfield et al's Zachor 2, CSL NW NW 20-35n-1w; Nepstead et al's Haugen 3, SW SW SE 2-35n-3w; and The Texas Company's E. Bruine 12, SW SE SW 9-35n-2w. They make a total of 22 active drilling locations in the Kevin field.

Takings of Big West Oil Company in the Kevin field enjoyed a 10-cent a barrel increase in price as the company raised its posting to 90 cents per barrel, the regular posted field price.

Drilling has been started on an important wildcat test to be drilled on the Bull Dome structure, Crook County, northeastern Wyoming, for which location was first released several weeks ago. Well, a joint test by Ohio Oil Company and Union Oil Company of California, is Casey-Government 1, SE NE NW 3-57n-62w. Operators spudded in to a depth of 296 feet, where 12½-inch surface casing was waiting on cement.

Wildcat test in the east Hiawatha district, Sweetwater County, southwestern Wyoming, Vermillion Oil Company's Amelia Horrocks 1, SW SW SW 7-12n-99w, east of the proved producing district of the Hiawatha field proper, has encountered shows of oil and gas at 2724 feet and was cleaning out for a test.

California

Spud First of 40 Projected Los Angeles Harbor Tests

Superior Oil Company has spudded West Wilmington B-1, semi-wildcat in the Los Angeles Harbor district. Should the operation prove successful, the company is committed to drill upwards of 40 wells on properties leased from the City of Los Angeles in that area. Location is on Morman Island, west of the Catalina Island steamer terminal near "A" and Fries Streets. The Ranger and Terminal zones are expected at 2500 and 3500 feet respectively.

Although earlier prospects have not been confirmed by additional coring, considerable interest centers on discovery of a new producing area in the Midway-Maricopa field in Kern County, where Republic Petroleum Company has cored some 75 feet of oil sand in a wildcat located ½-mile southeast of the Republic pool of the Midway field in Section 18-32-23. Drilled to about 1500 feet as a core-hole, rotary equipment was moved in, and coring picked up a promising oil sand body at 1830 feet. At 2080 feet, the test showed gray sand, while 75 feet of oil sand was cored in the upper measures.

In the Ojai district of Ventura County, Colony Oil Company was preparing to drill a shallow well in Section 12-4-22. It is the only wildcat active in this county.

General Petroleum Corporation's K. P. C. 1, Section 16-26-22, Semitropic area, Kern County, was abandoned after drilling to 6025 feet. It was on low structure. Top of the Mulina was estimated at 5210 feet. Light blow of gas was recovered in formation tests at 2710-2808, 2820-3100 and 3353-3450 feet with recovery of mud and salt water.

Michigan

Allegan County Wildcat Flows 200 Barrels Oil in 10 Hours

H. C. Nelson's Peters 1, Section 8-4-14, a wildcat two miles northwest of the old Overisel pool in Allegan County, is the first natural flowing discovery in Michigan this year, with a gauge of 200 barrels the first 10 hours. Traverse was topped at 1477 feet and bottom is at 1480 feet.

Two wildcats, one in the basin and the other in southwestern Michigan, were testing possible commercial oil saturation zones in objective formations this week. Sun Oil Company's Cameron 1, NE SE Section 10-18n-2w, Grout Township, Gladwin County, appeared to have a 50-50 chance for at least a small well. Dundee lime was picked up at 3766 feet, 5 feet higher than the closest dry hole, and showed 175 feet of oil from a pay at 3814-20 feet. The hole was carried to 3841 feet, where a water sand was logged. Operators planned to plug back and acidize.

Cameron 1 generally was regarded as the most important basin showing this year. Excepting a 2-barrel stripper completed by the company earlier in the year in Section 11-19n-6w, Clare County, in the Stray at 1425 feet, the basin has not produced a commercial wildcat this year. Cameron 1 is 6 miles west of the Buckeye field, Gladwin County.

Keyson Oil Company was waiting on orders at 1621 feet, 9 feet in the Traverse, on Steele 1, Section 32-2n-11w, Allegan County, after logging oil saturation.

C. L. Maguire, Inc.'s Clark 1, Section 32-16n-2w, Warren Township wildcat, Midland County, was waiting on possible abandonment orders at 5117 feet June 3. Word was awaited from Standard Oil Company of Ohio, a contributor in the deep test. At the present depth, probably just at the top of the Sylvania sand, the test is the deepest drilled in Michigan since 1935, but short of the all-time record of 6674 feet registered in Newaygo County, also in 1935. At 5115 feet a show of gas was believed picked up, but with the hole carrying 3700 feet of water, logged at 5098 feet, importance of the gas show was questionable.

Meanwhile, Sun Oil Company switched plans to junk State A1, Section 4-20n-3w, Franklin Township, Clare County, a wildcat, after failing in the original objective Dundee. This zone was topped at 4008 feet, and the test was drilling below 4678 feet. Unless too much water is logged to carry, operators now plan to go to the Lower Monroe, or about 4800-5000 feet.

Experiment With Pressure Decline in Agua Dulce

The Texas Railroad Commission has granted Gulf Plains Corporation a permit to conduct experimental operations in the Agua Dulce field, Nueces County, to determine whether or not, and to what extent, the liquefiable fractions in the gas had been reduced through pressure decline. The tests are to be made on the company's Elliff and Horne leases, and four wells will be affected.

UNITED STATES WELL COMPLETIONS

Arkansas

Miller County (Rodessa)—
F. W. Burford, Ritchie 1, 7-20-27.. 80 6173
Union County (Urbana)—
Marine Oil Co., Thompson A-10, 3-18-13 ..... 220 3590

California

Fresno County (Coalinga Shallow)—
Section 30 Oil Co., No. 7..... 20 1206
Fresno County (Coalinga Northeast)—
Amerada Pet. Corp., Ewing 1-20B.....No Est. 8203
Fresno County (Cantua Creek)—
Texas Co., S. P. 1..... 4 10,116
Kern County (Edison)—
Fred Gooden, Gooden 1..... 75 3800
Kern County (Midway-Sunset)—
Joseph McDonald, No. 20.....No Est. 1530
Kern County (Semitropic)—
General Petroleum, K. P. C. 1..... * 6025
Kern County (Ten Sections)—
Shell Oil Co., KCL A-38-20..... 950 8190
KCL B-38-21 ..... 758 8204
Los Angeles County (Athens)—
El Rey Oil Co., Westmore 1..... 115 9000
Los Angeles County (Long Beach)—
Allied Pet. Corp., Allied 34..... 175 10,636
General Petroleum, Jones 1..... 30 3360
Los Angeles County (Montebello)—
Texas Co., Wilcox 4..... 216 7666
Los Angeles County (Torrance)—
Emerald Oil Co., Oakley 1..... 65 3800
Los Angeles County (Wilmington)—
M.A.K. Oil Co., No. 2..... 192 3438
Union Pacific RR Co., U. P. 138.... 52 3922
Orange County (Huntington Beach)—
South Basin Oil Co., No. 93..... 35 7572
Ventura County (Shiells Canyon)—
Texas Co., Shiells 139..... 74 2710
Ventura County (Ventura Avenue)—
Shell Oil Co., Taylor 116.....2665 7520

Illinois

Clark County—
Allen et al, Morgan 1, nwc nw ne 31-10n-13w 27 481
H. R. Hall, Briscoe 1, nw sw sw 32-12n-14w 3 438
Clay County—
Benedum-Trees, Hagan 1, nw se ne 28-4n-7e ..... * 3105
Clinton County—
Gulf, Shell et al 1, n½ sw 1-1n-1w.4714 2936
Buehler 17, ce½ se sw 1-1n-1w...5567 2920
Buehler 19, se se nw 12-1n-1w....1637 2922
Samedan Oil Co., Buehler 3, ce½ ne sw 1-1n-1w 2160 2882
Shell, Buehler 8-C, sw se sw 1-1n-1w 5105 2910
Hansman 6-C, sw½ sw se 1-1n-1w.3021 2922
Algona, Marshall 4, nec se sw 12-1n-1w 360 2927
Fairhope Oil Co., Allison 3, nw ne sw ne 12-1n-1w 816 2919
L. C. Simmell, Kaelin 2, se sw sw se 12-1n-1w 130 2929
Smokey Oil Co., Allison 5, nw sw sw ne 12-1n-1w 2032 2912
Stoker et al, Southern RR 1, nw c ne se 12-1n-1w 960 2919
Hughes Pet. Co., Hurst 1, sw se ne ne 13-1n-1w 102 2912
O. W. Burroughs, Knolhoff 3, ne nw sw se 2-1n-2w ..... * 1363
Paul Mosebach, Maddox 2, ne sw sw 4-1n-3w 450 2430
Robbin 3, nw sw se 5-1n-3w..... 450 2442
Newton & Ward, Trame 1-D, ne ne nw 8-1n-3w 425 2436
W. S. Tatum, Voss 1, csw ne 15-2n-4w ..... * 2440
Edwards County—
Tide Water, Buntie 1, se se nw 21-1s-10e ..... * 3410
Jarvis Bros., Wick 2-A, s½ se ne 24-2s-10e 128 3125
Effingham County—
Clow et al, Johnson 1, nw ne se 17-8n-4e ..... * 1772
Fayette County—
Texas, McKee 6, ne se nw 6-6n-3e.. 147 1564
Wright 7, ne nw sw 31-6n-3e.... 140 1601
Zephyr, Smith 6, se sw sw 31-6n-3e. 240 1615
Blalock & Walters, Sealock 2, se ne ne ne 24-7n-2e 61 1568
Carter, Owen 3, se ne nw 17-7n-3e.. 48 1540
Hogge 2, ne nw sw 1-8n-3e..... 252 1593
McCollum 2, nw ne sw 2-8n-3e... 546 1521
State Bank 4, nw ne sw 10-8n-3e. 414 1602
Taylor 5, ne se nw 12-8n-3e..... 138 1474
Tipsword 1, nw sw ne 13-8n-3e.. 678 1517
Cline 4, ne ne se 14-8n-3e..... 192 1532
Brooks 2, sw nw se 23-8n-3e..... 204 1556
Grames 1, sw nw nw 24-8n-3e.... 198 1555
Dunaway 3, sw ne se 29-8n-3e.... 100 1501
L. B. Hoss, Sealock 7, ne nw nw 19-7n-3e 140 1559
Goad et al, Henry 1, nw ne ne ne 31-9n-4E ..... * 1714
Gibson & Jennings, McDonald 3, se ne se 13-7n-2e 65 1578
Hamilton County—
Ohio, Wilson 1, csw sw ne 6-6s-7e.. 524 2717
Jackson County—
Geo. Brainerd, Allison 1, ne sw sw nw 11-7s-3w ..... * 750
Madison County—
J. R. Wilson, Danderman 1, nec sw 1-5n-6w ..... * 1880
Marion County—
Scott-Carey, Grosch 1, se sw se nw 18-1n-1e ..... * 2927
Magnolia, Chitwood 47, sw nw sw 16-2n-2e 724 3531
Chitwood 48, sw ne ne sw 28-2n-2e 259 3505
Young 107, se sw se nw 28-2n-2e.. 795 3492
Ohio, Murray 16, ne se sw se 7-1n-2e 840 2103
Young Hrs. 47, nw ne sw se 20-2n-2e 576 3504
Loyd 30, nw sw nw se 28-2n-2e..2436 3487
Texas, City of Centralia 51, nw sw sw nw 4-1n-2e 1100 1877
Carr 7, cs½ nw nw 8-1n-2e.....1200 2061
Carr 8, nw sw ne nw 8-1n-2e.....1029 2062
Carr 8, cw½ sw nw 8-1n-2e.....1370 2061
Fyke 14, sw se se ne 8-1n-2e.... 105 2115
Shanafelt 8, sw sw se 9-2n-2e... 118 2119
Jett 30, nw sw sw 16-2n-2e..... 650 3512
Jett 31, ne sw sw 16-2n-2e.....3068 3520
Martin 15, ne se se 17-2n-2e..... 600 3500
Chapman 24, swc ne sw 28-2n-2e. 390 3470
Dunning 15, se sw se se 30-2n-2e.1105 3404
Canull 16, se ne sw se 31-2n-2e..2969 3350
Dunning 16, ne se nw se 31-2n-2e.1296 3344
Wayman 31, ne nw ne ne 31-2n-2e.1240 3404
Williams 18, sw se ne se 31-2n-2e.1963 3340
Hopkins 9, ne nw nw sw 32-2n-2e.1905 3340
McConnoughhoy 7, sw ne se se 32-2n-2e 1930 3509
Stonecipher 16, cn½ sw se 32-2n-2e 2336 3455
Lazaretti 6, nw sw sw 33-2n-2e..1440 3510
Lee 3, cn¼ sw se 33-2n-2e..... 119 2095
Richland County—
Pure, Snider 2, cw½ sw ne 6-4n-10e. 278 2915
Wabash County—
Pollock, Cisel 1, ne c nw se 2-1n-12w * 1950
Leighty, Hahn 1, nw ne sw nw 8-1n-12w 210 1580
Big Chief Dr. Co., Peach 2, se sw sw 34-2n-13w 722 2719
Tide Water, LeGier 7, se sw ne 17-2s-13w 41 1785
Longhorn Oil, Heil 7, sw nw 18-3s-13w 130 2500
Washington County—
Magnolia, Nowak 6, se nw sw 14-3s-3w 24 1252
McConnell 4, se se nw 15-3s-3w... * 1313

[*Continued on next page*]

Summary of Drilling Operations in the United States, Week Ended June 8, 1940

	WELLS COMPLETED							*PERMITS FOR NEW WELLS				
	Completions	Oil Wells	Gas Wells	Failures	Initial Production	Total 1940	Total this Date 1939	This Week	Total this Month	Total 1940	Total this Date 1939	Year Total 1939
Alabama	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
Arizona	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Arkansas	2	2	.....	.....	300	84	98	2	2	62	101	233
California	18	17	.....	1	5,426	473	474	10	10	492	424	1,174
Colorado	.....	.....	.....	.....	.....	.....	11	.....	.....	.....	.....	.....
Florida	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....
Georgia	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....
Illinois*	90	76	.....	14	69,033	1,616	1,621	135	135	1,906	.....	893
Indiana	11	5	3	3	497	174	63	.....	.....	.....	.....	.....
Kansas	46	36	.....	10	48,819	792	548	§	.....	857	644	1,583
Kentucky	9	4	.....	5	110	118	277	.....	.....	.....	.....	.....
Louisiana	33	23	2	8	4,529	712	424	19	19	727	569	1,444
Michigan	24	17	.....	7	1,792	566	584	23	23	524	570	1,419
Mississippi	6	1	.....	5	400	86	2	.....	.....	.....	.....	.....
Missouri	.....	.....	.....	.....	.....	6	.....	.....	.....	.....	.....	.....
Montana	3	3	.....	.....	565	71	50	.....	.....	.....	.....	.....
Nebraska	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Mexico*	11	10	.....	1	4,045	334	270	10	10	318	.....	293
New York	.....	.....	.....	.....	.....	460§	207	.....	.....	.....	.....	.....
North Dakota	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ohio	.....	.....	.....	.....	.....	349§	363	.....	.....	.....	.....	.....
Oklahoma	35	22	2	11	2,829	969	904	§	.....	838	933	2,059
Pennsylvania	40†	38†	.....	2	33½	1,166	547	.....	.....	.....	.....	.....
South Dakota	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Tennessee	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....
Texas	159‡	123	7	29	66,801	4,625‡	4,366	52	52	5,495	4,746	10,269
Utah	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
West Virginia	.....	.....	.....	.....	.....	237§	212	68	68	190	291	718
Wyoming	2	2	.....	.....	1,190	61	61	.....	.....	1	.....	.....
Total this week	489	379	14	96	206,306	12,907	11,084	319	319	11,410	8,278	20,075
Total last week	662	496	49	117	264,661	12,540	10,639	686	2,820	11,096	7,651	20,075
Total this year	13,029	9,578	696	2,755	5,008,992	.....	.....	.....	.....	.....	.....	.....

* This tabulation includes those states where weekly data are available; figures for Illinois date from October 15, 1939; New Mexico from August 1, 1939.
† Includes water-input wells.
§ Figures for week ending June 8, 1940, not available.
‡ Does not include South Texas figures for week ending June 8, 1940.

United States Well Completions—*Continued*

ILLINOIS—Continued

Wayne County—

Company, Well and Location	Init. Prod. Bbls.	Depth
Pure, Schoffield 3, c e½ nw sw 33-2n-8e	159	3115
H. H. Weinert, Muhlbach 3, cs½ sw nw 34-1s-7e	936	3300
Texas, Clark 2, se nw se se 4-2s-7e	840	3259
Dome O. & G., Harris 1, nw nw se 34-2s-8e	*	3878
Southern Pet. Corp., Vaught 1, cw½ sw ne 9-3s-9e	*	3427

White County—

Baldwin, Dauby 2, se nw se 31-3s-8e	80	3365
Jarvis Bros., Barbare 1, nw ne ne 33-3s-9e	65	3450
Paul L. Miller, Ford Hrs. 1, se sw nw 22-4s-14w	*	3005
Sun, Brown 1, cs½ se nw 2-4s-9e	735	3375
Shell, Austin 4, sw se sw 24-6s-8e	285	2520
Eason Oil, Storms 2, sw sw se 11-6s-9e	208	2283
Exchange Oil, Rudolph 2, se se se 11-6s-9e	582	2276

Indiana

Gibson County—

Midwest Dev., Bryant 3, nw nw nw ne 15-2s-9w	10	1384
Papoose Oil Co., Cooper 3, se nw sw 18-3s-13w	22	2917
C. R. Obermeyer, Kleiderer 1, se se se 28-3s-14w	265	2795

Jay County—

Allen Burke, McFarland 1, swc ne sw 24-22n-14e	*	1143

Posey County—

J. M. Roberts, Keck 1, sw se nw 34-3s-14w	75	2805
Sun, Schroeder 3, sw se nw 1-7s-12w	125	1888

Spencer County—

W. W. Damron, Beckort 1, ne sw 29-7s-6w	¶5.40	935
Ky. Nat. Gas, Wirthwein 1, sw se	¶2.60	646
Yeager 1, cnw nw 31-7s-6w	¶.30	925
Hedges & Rossi, Eble 1, sw nw nw 7-7s-7w	*	1064

Warrick County—

S. R. Traves, Moyer 1, nw sw nw 13-5s-9w	*	1920

Kansas

Barton County—

Gore et al, Burmeister 1, c n½ nw se 27-16-11w	*	3415
Vickers et al, Valenta 1, c w½ ne ne 31-16-11w	*	3283
Stanolind, Deal 3, csl se ne ne 35-16-13w	*	3372
Schmidt 3, cwl nw ne se 35-19-11w	*	3387
Stuckemann 15, se se nw sw 11-20-11w	3000	3293
Jutting 6, cn½ ne nw 15-20-11w	342	3312
Alpine, Schartz 1, cn½ nw sw 1-20-12w	*	3386

Butler County—

Sinclair Prairie, Graham 8, sw ne se 4-26-5e	7	2619

Cowley County—

Shawver, Boeger 1, nw ne ne 21-30-4e	393	2794
Connell, Dickenson 1, nwc se 30-30-4e	*	2885
Ryan Consolidated, Couch "A" 1, sw ne se 13-30-5e	246	2800
Western Kansas O. & R. Co., Ferguson 7, sw ne sw 21-30-8e	40	2184
Wakefield, Wilson 3, se ne nw 4-32-3e (OTD 3150)	235	3239

Ellis County—

Cities Service, Hall "A" 6, c s½ ne sw 14-11-17w	*	3393
Rumsey 15, nw se se 23-11-17w	3000	3666
Tide Water, Riddler 1, ce½ ne sw 1-11-18w	3000	3447
Skelly, Kempe 5, cs½ nw ne 12-11-18w	3000	3394
Phillips, Hendrick 8, cs½ sw ne 13-11-18w	3000	3379
Shaffer, Oswald 1, cw½ se se 11-12-16w	859	3225
Lario, Walters "D" 1, cn½ nw ne 2-12-18w	804	3580
Skelly, Jensen 1, ce½ ne se 22-12-18w	492	3715

Ellsworth County—

Continental et al, Ploog "A" 4, se nwc sw 27-17-8w	772	3230
Pryor et al, Stratman 1, cw½ nw nw 1-17-10w	3000	3297

Greenwood County—

Lyke, Morris 4, nec sw 5-24-12e	35	1806

Marion County—

Raymond, Schick 2, ne nw nw 28-17-4e	380	2418

McPherson County—

Republic Natural, McMillen 2, cn½ sw sw 7-20-5w	1020	3356
McMillen 3, cw½ se nw 7-20-5w	96	3381
McMillen "B" 2, cn½ nw sw 7-20-5w	1020	3389
McMillen "B" 1, cs½ nw sw 7-20-5w	1038	3394
Swanson 1, cs½ nw sw 18-20-5w	3000	3327
Mattson 3, cs½ nw sw 19-20-5w	3000	3332
Knackstedt 3, cn½ sw nw 30-20-5w	591	3346
Cities Service, Pearson 2, ce½ se se 19-20-5w	3000	3381

Pawnee County—

Lauck et al, Gilkson 1, ce½ ne sw 21-22-16w	*	4125

Pratt County—

Skelly, South Maxedon 2, cw½ sw se 25-27-11w	545	3469

Reno County—

Lloyd-Frost & Study, Haury 1A, cel ne nw sw 1-23-4w	23	3397
Phillips, Brandenstein 2, cs½ sw nw 35-19-10w	1141	3291

Rooks County—

Krueger, Tatkenhorst 3, cn½ nw se 10-9-16w	482	3206

Russell County—

Coralena, Erlich 2, cs½ sw se 19-14-13w	121	2955
Dumler 10, cel ne sw nw 36-15-14w	1811	3317
Shields, Giese 4, cn½ nw ne 28-14-13w	2294	2325
Texas, Boxberger "B" 1, ce½ ne ne 22-14-14w	1032	3072
Hartman & Blair, Boxberger "D" 2, sec 14-14-14w	*	3299
Simpson et al, Rush 1, cw½ nw sw 33-14-14w	*	3230

Stafford County—

Stanolind, Hitz 4, ce½ nw nw 2-22-12w	3000	3591
Deep Rock, Turner 4, cn½ se sw 2-24-11w	3000	3767

Kentucky

Butler County—

J. P. Patrick et al, Harrison 4	*	388

Daviess County—

Master Oil Co., Richmond 4	55	1227
J. C. Ellis et al, Hansford 7	*	1251
Smith & Tombs, Utica Mill Lot 1	*	1500
R. Hal Compton et al, Jackson 1	43	1010
Dr. Hardy, Bean 7	10	605

Ohio County—

R. S. & G. Gas Co., Downs 8	*	200
C. V. Guthrie, Hastings 1	*	351
C. S. Harmon et al, Tuttle 6	10	340

North Louisiana

Bossier Parish (Sligo)—

Triangle Dr. Co., Chatman 2, 18-17n-11w	60	3131

Caddo Parish (Pine Island)—

J. P. Griffin, Muslow 2, 26-21n-16w	15	2266
N. W. Pannill, Muslow 1, 32-21n-15w	100	1560
Sklar Oil Co., Hobbs 2, 21-21n-15w	20	1651
Texas Co., Herndon 10, 14-21n-15w	90	1650
Lake Front Co. 5, 8-20n-15w	*	1491
O. K. Hickman, Lavine 1, 12-20n-16w	20	1507

Grant Parish (Wildcat)—

John Pundt, Reed Estate 1, 10-7n-3w	*	3153

Union Parish (Monroe)—

Memphis Nat. Gas Co., Lankford 8, 2-21n-3e	¶.15	2190

Webster Parish (Cotton Valley)—

Mid-States Oil Corp., Brener-Breamer Unit 1, 202-1n-10w	450	8624

West Carroll Parish (Wildcat)—

The Hunter Co., Lee 1, 27-20n-10e	*	3027

South Louisiana

Abbeville—

Continental, Baudoin 1	*	11,345

Charenton—

Commerce, Fee 9 (wo)	196	6772

Cheneyville—

Texas-Canadian, Mathis 1 (wo)	100	5765

Golden Meadows—

Martex, Falgout 5	192	5545
Temple Hargrove, Gaspard, Rizon 5	196	5646

Grand Lake—

Superior, State 12	356	9922

Henderson—

Texas, St. Martin 13	540	8536

Jennings—

Port City, Heywood 26	126	2497

Lafitte—

Texas, LL&E-Lafitte 16	722	10,122

Little Bayou—

G. Helis, Schwing 10	¶	8960

Potash—

Humble, Orleans Levee Board 43	260	8085

University—

Wm. Helis, LSU A-6	214	...

Venice—

Tide Water, Johnston 1	200	8800

Ville Platte—

Continental, Devile 6	127	9931
Haas 6	127	9889
Opel-St. Landry 7	108	9902
Tate 1, Tr. 9	72	9891

White Castle—

Jolley, Adams 1	240	6424

East Baton Rouge Parish—

Goldin & Farris, Paulet 1, McInnis area	*	6838

St. Charles Parish—

R. H. Parker, Thompson 1, Boutte area	*	11,160

St. Landry Parish—

S. Thompson, Murphy 1, Port Barre area	*	7749

Terrebonne Parish—

Barnsdall, Nelson Dev. Co. 1, Point Au Fer	*	11,700

Michigan

Allegan County—

Fletcher-Lemans, Hulsman 1, nw sw sw 3-3n-14w	125	1497
Howard E. Fowler, Japink J-5, sw sw nw 3-3n-14w	300	1425
Japink J-6, se sw nw 3-3n-14w	400	1441
Klingberger 1, ne sw ne 4-3n-14w	35	1540
W. S. Cook, Essink 2, nw se ne 4-3n-14w	200	1493
Clapsaddle & Harris, Shlevink 1, ne ne nw 9-3n-14w	*	1615
Muskegon Oil Corp., Miller 2, sw ne ne 10-4n-13w	*	1690

Gladwin County—

C. W. Teater, Stahl 1, nw se sw 24-18n-1w	*	3605

Ionia County—

Neil Wagenaar, Tr., Hooper 1, nw sw se 29-5n-8w	*	2469

Isabella County—

Richard W. Reading, Fee 2, nw ne nw 16-16n-3w	5	3746

Kent County—

Certain-Teed Prod. Co., Fee 18, nw ne se 33-7n-12w	90	1885
Welsh Oil Co., Bunker 3, sw nw se 5-6n-12w	10	1146
Travista 1, se nw se 3-6n-12w	7	1830
Rex O. & G. Co., P. M. R. R. 4, sw ne ne 3-6n-12w	100	1791
Crystal Oil Co., Porter 1, nw ne se 14-6n-12w	10	1911
Davell Pet. Corp., Collins 2, se nw ne 23-6n-12w	30	1913
Gordon Oil Co., Rogers 1, sw sw ne 14-6n-12w	*	1974

Monroe County—

Berell Oil Corp., Yape 1, sw se nw 7-7s-6e	*	2203

Ottawa County—

Gulf, Rapp 4, nw nw se 23-7n-13w	115	1880
Rapp 5, nw ne sw 23-7n-13w	35	1877
Smith Pet. Co., White 2, sw sw ne 23-7n-13w	200	1870
White 3, se sw ne 23-7n-13w	95	1871
Turner Pet. Co., White 2, se ne nw 23-7n-13w	35	1884
Bridge Basin Oil Co., Van Zoeren 1, nw nw sw 12-5n-14w	*	1759

Mississippi

Hinds County (Wildcat)—

Royal Oil Co., Hinds Junior College 1, 33-5n-2w	*	7647

Holmes County (Wildcat)—

Exchange Oil Co., Thurmond 1, 21-15n-3e	*	5003

Scott County (Wildcat)—

E. L. Martin, Newell Mineral Lease Co. 1, 25-8n-6e	*	6370

Wayne County (Wildcat)—

Hill & Hill, Kalmia Realty Co. 1, 5-7n-9w	*	6723

Yazoo County (Pickens)—

Exchange Oil Co., Louise Dixon 1, 29-12n-3e	*	5274

Yazoo County (Tinsley Dome)—

Union Prod. Co., Twiner 3, 1-10n-3w	400	4937

Montana

Glacier County (Cut Bank Field)—

Glacier Prod. Co., Whetstone 3, cse nw 8-33n-5w	15	2855

Toole County (Kevin-Sunburst)—

W. M. Fulton, Thompson 4, cnl sw ne 28-35n-3w	500	1785
Vanderpas, Cedar Creek 7, cwl sw se 31-35n-1w	50	1430

New Mexico

Eddy County—

Aston-Fair et al, State 6-B, sec nw 32-17s-30e	1104	2893
Continental & M. Yates, III, Brainard 5, ne nw sw 11-18s-29e	*	2832
R. W. Fair et al, Brainard 8, se ne ne 10-18s-29e	540	2631
Grayburg Oil Co., Keeley 5-A, nec se 24-17s-29e	28	3130
Geo. D. Key, Jr., Key 1, c se ne 11-17s-29e	200	2552

United States Well Completions—*Continued*

Company, Well and Location	Init. Prod. Bbls.	Depth
Lea County (Arrowhead)—		
Humble, State 2-M, csw se 18-22s-37e	1176	3720
Ohio Oil, State-McDonald 18, ne sw ne 13-22s-36e	192	3775
Lea County (Mattix)—		
Texas Co., Fristoe 1-B, csw sw 26-24s-37e	33	3510
Lea County (Penrose)—		
J. C. Clower et al, Chritmas-Gulf 6-B, se sw nw 28-22s-37e	85	3680
Lea County (Vacuum)—		
Magnolia, State-Bridges 65, cse nw 14-17s-34e	432	4660
Phillips, State-Hale 6, csw se 35-17s-34e	255	4714

Oklahoma

Carter County—		
Batson et al, Walker 1A, sw nw sw ne 20-4s-2w	70	1891
Shell, Tubbi 5, nw ne nw 24-4s-3w (OTD 1127)	12	1149
Tubbi 35, sw ne nw nw 24-4s-3w (OTD 1101)	20	1175
Creek County—		
Clark, Mills 1, nwc sw 15-15n-9e	*	3649
Tilley, Wright 3, ne sw se 17-17n-8e	50	2341
Crosbie, Mosquito 2, se nw ne 20-17n-9e	53	2560
Moore et al, Sheff 3, ne sw ne 20-17n-9e	60	2582
Carpenter, Fife 1, nw sw sw 28-18n-11e	25	1616
Hughes County—		
Betts, Peebles 1A, se sec sw 29-8n-9e	*	450
Tomlinson et al, Carter 1, swc ne 17-8n-10e	¶4.0	2885
Jackson County—		
Navajo, Hensley 7, sw ne nw 10-1n-20w	14	1551
Pendleton et al, Stokes 8, ne nw sw 11-1n-20w (OTD 1368)	*	1460
Latimer County—		
LeFlore G. & E. Co., Coley 32, ce½ ne ne 8-6n-22e	¶1.1	1825
Lincoln County —		
Laffoon, Stewart 3, sec nw 15-13n-6e	150	4305
Muskogee County—		
Tierney, Drew 3, sw swc ne 17-13n-16e	30	2095
Okfuskee County—		
Summit, Hilderbrand 2, nw nw se sw 18-10n-11e	348	2154
Oklahoma County—		
Sinclair Prairie, Stamper 9, sw se nw 30-11n-3w	181	4072
Okmulgee County—		
Price et al, Grayson 7A, se sw ne ne 21-14-14e	*	1124
Lampert, Flint 5A, ne ne sw se 27-14n-14e	2	1130
Osage County—		
Moore, 33, se se sw sw 9-21n-9e	135	2608
Pawnee County—		
Sample, Bellis 1, se ne sw ne 28-20-9e	70	2090
Payne County—		
Cities Service, State "B" 1, se ne se 33-20n-4e	*	4130
Texas, Minnich 3, cw½ nw ne 11-17n-1e	220	4952
Pittsburgh County—		
Southeastern O. & G. Co., Moran 2, cnw se 19-3n-12e	*	1610
Pontotoc County—		
Patterson, Isaacs 1, sw nw ne 3-4n-4e	*	3230
Lake, Summers "A" 2, sec 26-5n-4e (OTD 2475)	142	2657
Pottawatomie County—		
Gulf, Hunich 2, swc se 5-9n-5e (OTD 4530)	*	4548
Sinclair Prairie, M-Qua-Ka 3, se sw sw 11-7n-4e (OTD 4190)	20	4181
G. & M., Pierce 3, nwc ne 6-10n-4e	582	4474
Butcher, School Land 1, se nw nw 36-10n-4e	320	4294
Elm et al, Evans 1, sec ne 17-10n-5e	*	4792
Seminole County—		
Shephard, Scroggins 4-B, sw nw sw 34-7n-6e	225	2862
McIntyre, Richardson 1, ne sw nw 19-10n-8e	*	3558
Stephens County—		
Central, Graham 2, sw swc ne 12-1n-5w	100	6005
Pace, Dierks 2, se ne nw nw 13-2s-8w	*	2168

Pennsylvania

BRADFORD DISTRICT

Tapp, Gallets & Buffington, Trs., fee	4	...
B. McCaffrey et al, fee	1	...
Penn Valley Crude Oil Corp., fee	2	...
Pine Run Oil Co., Bing 130-1-2-3-4-6	4	...
Bradford Tr. Co., 17 wells	17	...
Forest Oil Corp.	1	...
Forest Oil Corp.	1	...
Niagara Oil Corp., 3 wells	3	...
Water Intake Wells		
N. V. V. Franchot, Mgr., Trustee, Campbell	..	...
Pine Run Oil Co., Bing 130-1-2-3-4-6	..	...
Forest Pet. Corp.	..	...
Niagara Oil Corp., 7 wells	..	...
MIDDLE DISTRICT		
John H. Glass, Mitchell	½	...
Water Intake Wells		
Joseph Karl et al, lot 106	..	...
BUTLER-ARMSTRONG		
E. Z. Peffer, Peffer	*	...
L. B. Garing, Garing	*	...

Texas Panhandle

Carson County—		
Gulf, Cooper 28	207	3146
Gray County—		
Indian Ter'y Illum. Oil Co., Smith 13	342	3269
King Oil Co., Simpson 7	369	3265
Moran Bros. Dr. Co., Skidmore 4	336	3292
Phillips, Morse 3, sec 68	*	3007
Texas Co., Pope 4	159	3290
Hutchinson County—		
J. E. Crosbie, Inc., Pitts 30	395	2935
Gulf & Panhandle Ref. Co., Dial 97	129	2946
J. R. Phillips et al, McClay 1	30	3282
Phillips, Min Boyd 2	¶5.2	3179
Shell & Sinclair Prairie, Pritchard-Gulf 1-B	¶3.4	3175
Harry Stekoll et al, Whittenburg 10-B	50	3059
Whittenburg 9-H	45	2807
Earl E. Wherry et al, Harvey Sisters 1	40	2984
Moore County—		
Canadian River Gas Co., Thompson 3-A	¶39.6	2633
Texoma Nat. Gas Co., Coon 13-M	¶12.25	3333
Coon-Sneed 7-M	¶28.6	3049
Sneed 23-P	¶12	3080
Wheeler County—		
Columbia Fuel Corp., Plummer 5	182	2446

North Texas

Archer County (Hull-Silk)—		
Dillard-White & Duncan, Nichols 5	1152	4404
Bert Ligon et al, White 6-D	912	3912
White 1-E	*	4445
Pet. Producers Co., White 2	1176	4417
Phillips, Little-Novella 1	864	4413
Archer County (Mankins)—		
British-American O. P. Co., Wilson 1-C (pb to 4706 ft)	215	5425
Wilson 1-F	96	4831
Archer County—		
Cato Oil Co., Anderson 12	236	1072
Anderson 13	248	1074
H. Craig et al, Kunkel 1	6	1209
Bert Ligon et al, Little 6-A	*	1377
White 12-D	*	1675
Rancho Oil Co., Prideaux 19	7	673
Young & Woody Dr. Co., Abercrombie-Taylor 1	3	1349
Baylor County (Wildcats)—		
Hattie B. Madden et al, James 1	*	1250
R. T. Myers et al, Portwood 1	†	600
Clay County—		
E. N. Costley et al, McInness 2-C	112	1087
McInness 8	5	270
Clay County (Halsell)—		
Bridwell Oil Co., Halsell 4-A	*	6042
Clay County (Shell-Henderson)—		
Shell, Henderson 2	238	3551
Clay County (Wildcats)—		
Staley Oil Co.-W. B. Omohundro, Percifield 1	*	6280
E. N. Costley-Bell O. & G. Co., Bevering 1	*	2505
Cooke County—		
Mudge Oil Co., Meador 5	80	1632
Seltz-Comegys & Seltz, Poteet-Humble 9	28	1190
Denton County (Bolivar)—		
Geneva Oil Co., Knox 1	*	1380
Jack County—		
Lewis Prod. Co., Derrick 1	328	3200
T. C. Jones et al, Smith 8	8	380
Smith 9	9	380
Smith 10	17	373
Welch-Hill Oil Co., Griffith 1-A	*	320
Montague County—		
Geo. Golden et al, Tucker 1	*	1260
Montague County (Bonita)—		
Magnolia, Gilbert 1	2352	5434
Sinclair Prairie, Doty 1 (pb to 5438 ft)	1808	6025
Throckmorton County—		
Walter Neustadt et al, Brown 1	*	727
Brown 3	*	702
E. F. Scott et al, Beatty 1	*	1005
Wichita County (K-M-A)—		
Barrow-Grace Wood, Birk 3-A	392	4130
Consolidated Oil Co., James 13	984	4011
Dalport Oil Co., Munger 4	1208	3870
W. B. Hamilton et al, Martin 1-E	2200	3775
Kadane-Griffith Oil Co., Martin 2	824	3823
F. W. Merrick, Inc., Jones 3	640	4100
Shell-Phillips, Griffin 8	868	3990
Wichita County (Wildcat)—		
Hedrick Oil Co., Cooper 2	*	1338
Wichita County—		
King Oil Co., Waggoner Est. 12-R	60	1588
Wilbarger County—		
King Oil Co., Waggoner 12-N	†	710
Pois & Schultz, King 3 (pb to 1460 ft)	10	2032
Young County—		
Holbrook & Woods, Watson 14-B	12	557

Texas Gulf Coast

Ariola—		
Houston, Ariola Fee X-5	335	3234
Houston-Republic B-4	110	4150
Houston-Republic B-10	365	3770
Bammell—		
Harrell, Graves 1-A	31	6235
Humble, West Fee 46-C	113	5914
Bay City—		
Hamman, Foote 1	282	9226
Foote 2	390	9244
Richers 1 (wo)	319	9173
Slone 5 (wo)	151	8924
Skelly, Cobb 19	388	7495
Boling—		
Mackhank, Farmer C-3 (wo)	11	4506
Farmer C-7 (wo)	39	4420
Caplen—		
Sun, State 2-26	¶	7900
Clear Lake—		
Humble, West Fee 46-C	449	5914
Dickinson—		
Atlantic, Fredericks 1	214	8050
Esperson—		
General Crude, Moore's Bluff 7 (wo)	135	3097
Fairbanks—		
Amerada and Stanolind, Foley 21	149	6838
Hankamer—		
Gulf, Weiser 1	53	4157
Hardin—		
Dyer et al, Humphrey 3	93	7609
Hastings—		
Stanolind, Edwards 16	350	6097
Hull—		
Keown, Hankamer-Petivo	393	3237
Kubela—		
Texas, Kubela 1	76	4597
Joe's Lake—		
Republic, Sterne 4	*	5000
Livingston—		
Refugio, Faling 4	44	4259
Lovell Lake—		
Humble, Broussard 17	191	7791
Magnet—		
Humble, Blue Creek Ranch 5	447	1542
North Houston—		
Kirby, Harbaugh 1	47	6856
Old Ocean—		
Harrison & Abercrombie, Chenault 1	479	10,600
Pickett Ridge—		
Texas, Pierce A-28	59	4696
Port Neches—		
Phillips, Stark 1 (new sand)	60	4560
Segno—		
Gulf, Wing 34	583	8067
Sour Lake—		
United Gas, Moore 2	6	900
South Liberty—		
South Oil, Harrison-Schade 4 (wo)	41	3216
South Thompsons—		
Gulf, Wolters 15	145	5410
Humble, Davis Y-31	403	4362
Quintana, Wolters 13	97	5447
West Beaumont—		
McCarthy, Longe 2-B (wo)	81	6104
West Columbia—		
Humble, Hogg-Hosphet 20	11	3085
West Orange—		
Merrick, Norwood 1	136	5903
Withers—		
Texas, Pierce C-72	502	5392
Calhoun County—		
Eura B., Traylor 1, Green Lake area	*	7507
Chambers County—		
Standard of Texas-Salt Dome, State 61-54	*	9538
Fort Bend County—		
Fabriguez & Sacks, George 1, Polley Survey	*	len.
Galveston County—		
Stanolind, Hulen 1, Alta Loma	450	9961
Grimes County—		
E. R. Cokers, Freund 1, Carlos area	*	2939
Liberty County—		
Welch and General Crude, Kirby 1	*	7507

East Texas

Kilgore Area—		
Mabee O. & G. Co., Cole-Shell 26 (120-ac)	3000	3508
Texas Canadian Oil Corp., Watson 2 (3-ac)	6500	3552
Longview Area—		
B. F. Phillips et al, Everett 2, blk 14 (21.55-ac)	1500	3664
Anderson County (Long Lake)—		
H. L. Hunt Oil Co., Cartmel-Tidal 3	¶115 & 89	4337
Smith County (Wildcat)—		
Carmerson Corp., Simpson 1	*	5508
Van Zandt County (Wildcat)—		
J. B. Daniel et al, Odom 1	*	4038

United States Well Completions—*Continued*

West Texas

Company, Well and Location	Init. Prod. Bbls.	Depth
Crane County (Jordan)—		
Kewanee Oil Co., University 7-B	1624	3578
Ector County (Foster)—		
A. & M. Oil Co., Johnson 7	307	4274
Atlantic Ref. Co., Henderson 11	1648	4230
Johnson 4-E	408	4250
C. A. Everts et al, Gist-Phillips 1	250	4305
Forest Dev. Corp., Moss 1	278	4203
Schermerhorn Oil Corp., Johnson 6-B	435	4189
Shell, Witcher 2-C	620	4147
Stanolind, Witcher 42	794	4205
Sunray Oil Co., Johnson-Landreth 1-F	336	4155
Johnson-Phillips 1-K	109	4325
Ector County (Goldsmith)—		
Gulf, Goldsmith 279	451	4212
Goldsmith 281	1111	4183
Goldsmith 283	1111	4247
Goldsmith 284	1595	4241
Goldsmith 285	473	4175
Phillips Pet.-Pure, Cowden 88	2294	4168
Ector County (North Cowden)—		
Barnsdall Oil Co., Smith 8	1364	4210
Tide Water, T.P. Land Trust 2	297	4240
Ector County (Wildcat)—		
Ochiltree & Robinson, Johnson 1	*	4340
Gaines County (Seminole)—		
Amerada-Humble, Blakemore 1	266	5355
Magnolia & Atlantic, H. & J. 5-219	735	5261
H. & J. 5-265	724	5306
Hockley County (Slaughter)—		
J. W. Murchison et al, Slaughter 5	527	5010
Stanolind, Slaughter 12-B	908	5000
Hudspeth County (Wildcat)—		
H. Krupp Oil & Land Co., Thaxton 1	*	6402
Pecos County (Pecos Valley)—		
Sahara Oil Corp., Pecos Valley 1-22	*	1690
Pecos County (Toharg)—		
Ohio Oil, Yates 1-G-12	30	500
Tom Green County (Wildcat)—		
B. C. Mann et al, Funk 1 (pb to 1129 ft)	20	1562
Winkler County (Keystone)—		
Sam Weiner et al, Jenkins-Conoco 3	258	3402
Winkler County (Wildcat)—		
Gulf, Scarborough 1-A	*	4276
Yoakum County (Wasson)—		
Aloco Oil Co., Elliott-Texaco 3	356	5246
Argo Oil Corp., Comer 3-C	1081	5145
Honolulu Oil Corp., Hovencamp 6-890	1072	5085
Humble, Bennett 5	546	5235
Oil Dev. Co. Willard 15-803	1232	5215
Shell Oil, Baumgart 10-A	1580	5180
Baumgart 8-B	648	5200
Baumgart 11-D	1562	5130
Baumgart 7-E	1052	5164

Wyoming

Company, Well and Location	Init. Prod. Bbls.	Depth
Natrona County (Cole Creek)—		
General Pet. Corp. 1-21-G, cnw nw nw 21-35n-77w	350	8050
Park County (Oregon Basin)—		
Yale Pet. Co., Frisby 2-A, cnw se nw 32-52n-100w	1800	3472
Sublette County (LaBarge)—		
Marvel Oil Co., Government 1-H, cel ne se 28-27n-113w	200	1066
Weston County (Osage)—		
Patterson Oil Co., No. 21, nw sw se 17-46n-63w	12	700
Niobrara County (Lance Creek)—		
Continental, Dielman 7-B, se se ne 7-35n-65w	1050	5446
Sublette County (LaBarge)—		
Texas Co., Government 1-E, w sw nw 27-27n-113w	140	1091

*Failures; †Junked; ‡Million cu. ft. gas.

Ask Boost for Hitchcock

Operators in the Hitchcock field, Galveston County, have requested the Texas Railroad Commission to increase the allowable for the field. At a hearing last week, testimony was presented to show that the most efficient rate of flow ranged between 60 and 75 barrels per well. The wells are allowed to produce 38 barrels daily now.

Maco Stewart & Son and N. W. Hunter operate the 14 wells in the field. Paul Wittman, superintendent for Stewart, said that drilling ceased last June when operators agreed to drill no more, in view of the fact that the allowable for the wells was fixed at 100 barrels. Thereafter, Wittman said, the operators asked for a cut, and the commission later reduced the allowable to 38 barrels.

During the first quarter of 1940, pressure in the field increased 52 pounds, according to testimony introduced.

Operators said that Pan American Petroleum and Transportation Company was willing to buy as much as 2500 barrels daily from the field over a two-year period.

Order 20-Acre Proration Units for Lolita Field

The Texas Railroad Commission has entered an order providing for 20 acre proration units in the Lolita field, Jackson County. Wells may be drilled 330 feet from lease lines and 660 feet apart.

The rule provides for proration on acreage and per well, with 75 percent on the former and 25 percent on the latter factor. No more than 20 acres may be assigned to a unit, and tracts of less than 20 acres shall be assigned according to size.

The commission requires 1300 feet of surface casing cemented to the surface, and an oil string cemented at least 500 feet above the shoe. A maximum gas/oil ratio of 2000/1 is provided.

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WILDCAT REPORT
New Starts and Completions

ARKANSAS
FIRST REPORTS

Arkansas County—C. W. Robinson's E. P. Fox 1, cse 23-5-3, mat.

Sevier County—Gramp Oil Co.'s Floyd Phillips 1, se nw nw 35-9-30, mat.

CALIFORNIA
FIRST REPORTS

Orange County—Lindley C. Morton's Thomas 1, sec 23-4-10, foundation, Anaheim area.

Tulare County—Trico O. & G. Company's Newland 3, sec 21-24-23, lcn, Trico area.

Ventura County—J. A. Englishes' Lankershim 3, sec 13-4-19, lcn, Sespe area.

COMPLETIONS

Fresno County—The Texas Co.'s S. P. 1, sec 23-17-15, bottomed 10,116 feet, plug 9413 feet, cleaned out to 9413 feet, completed flowing 2,500,000 cubic feet gas, 78 bbls daily salt water on 2/64-inch bean, produced 750,000 cubic feet gas, 4 bbls daily condensate. Temblor, 6038 ft; Upper Variegated, 6088 ft; Kreyenhagen, 7750 ft; Eocene, 8775 ft; Green sand, 8778 ft; Gatchell equivalent, 9345-9353 ft. Cantua Creek area.

Fresno County—Section 30 Oil Co.'s No. 7, sec 30-19-15, bottomed 1206 ft, water shut-off 1017 feet, top oil sand 1088 feet, initial production 20 bbls daily, 13-gravity oil, cut 10 percent, Coalinga Shallow area.

Kern County—General Pet. Corp.'s K.P.C. 1, sec 16-26-22, bottomed 6025 ft; first Mya zone, 2800 ft (no gas), Mulinia, 5200 ft; formation tests 2710-2808, 2820-2900 and 2850-3150 ft, recovered mud, no gas, formation test 3353-3450 ft, recovered mud and salt water with trace gas, abnd, Semitropic area.

Los Angeles County—El Rey Oil Co.'s Westmore 1, Imperial Highway and Western Avenue, bottomed 9063 ft, plug 9000 ft, Miocene, 8190 ft, perforations 8564 ft, produced 115 bbls daily, 32.2-gravity, cut 6 percent, Athens area.

KANSAS
FIRST REPORT

Cowley County—W. M. McKnab's McKown 1, nec sw 31-33-5e, rig.

NORTH LOUISIANA
COMPLETIONS

Grant Parish—John Pundt's Reed Estate 1, ne nw sw 10-7n-3w, elev 101 ft, Cockfield 715 ft, gas sand 1249-80 ft, sand so 1280-1300 ft, Vicksburg 1365 ft, Cook Mountain 1388 ft, Sparta 1600 ft, Cane River 2103 ft, Wilcox 2374 ft, abnd 3153 ft, sandy shale.

West Carroll Parish—The Hunter Co.'s Lee Unit 1, ne 27-20n-10e, elev 104 ft, gas rock 2423-2555 ft, abnd 3027 ft.

SOUTH LOUISIANA
FIRST REPORTS

Avoyelles Parish—W. C. Brock's Snowden 1, sec 22-3n-5e, lcn.

Calcasieu Parish—W. T. Burton's Mayo Realty Company 1, South Lake Charles area, sec 1-11s-8w, lcn.

Lafourche Parish—Gulf's Allon Land Co. 1-A, 3 mi sw Delta Farms, sec 5-20s-22e, lcn. Lisbon-Iberia's Bergeron 1, Lafourche Crossing area, sec 132-15s-17e, lcn. Tide Water's Delta Farms 2, Delta Farms area, sec 1-17s-22e, lcn.

Orleans Parish—W. T. Burton's State 3, Lake Catherine area, 5100 ft n by 57° w of L&N well No. 1, lcn.

Plaquemines Parish—California Co.'s Delta Minerals 1, lease 11, Stella area, sec 2-15s-24e, lcn.

St. Charles Parish—Texas Co.'s Lake Salvador-State 1, Lake Salvador area, sec 26-16s-22e, lcn.

COMPLETIONS

East Baton Rouge Parish—Golding & Farris' Paulet 1, McInnis area, sec 57-7s-1e, abnd 6838 ft.

St. Charles Parish—R. H. Parker's Thompson 1, Boutte area, sec 87-13s-20e, abnd 11,160 ft.

St. Landry Parish—Stanley Thompson's Murphy 1, Port Barre area, sec 25-5s-6e, abnd 7749 ft.

Terrebonne Parish—Barnsdall's Nelson Development Co. 1, Point Au Fer Island, sec 2-21s-11e, abnd 11,700 ft.

MICHIGAN
FIRST REPORTS

Allegan County—Bell & Marks' Spahn 1, ne sw sw 9-3n-12w, rig.

Monroe County—Jacob Beck's Sancrant 1, nw sw nw 19-7s-7e, lcn.

Newaygo County—C. D. Hoffman's Wilde 1, nw sw ne 17-11n-14w, lcn. M. D. Shine's Van Horn 1, se sw se 4-12n-12w, rig.

Saginaw County—Freeman Oil Co.'s Krych 1, ne se se 26-11n-2e, rig.

Washtenaw County—R. P. Cook's Carlton 1, nw nw nw 31-1s-7e, lcn.

COMPLETIONS

Ionia County—Neil Waganaar, Trustee's Hooper 1, nw sw se 29-5n-8w, Campbell twp, Traverse 2115 ft, Dundee 2410 ft, Monroe 2455 ft, abnd 2469 ft.

Monroe County—Berell Oil Corp.'s Yape 1, sw se nw 7-7s-6e, Summerfield twp, Trenton 1985 ft, abnd 2203 ft.

Ottawa County—Bridger Basin Oil Corp.'s Van Zoeren 1, nw nw sw 12-5n-14w, Traverse 1682 ft, abnd 1759 ft.

MISSISSIPPI
FIRST REPORT

Madison County—Ralph A. Johnston's J. W. Locke-School Board 1, ne ne 16-11n-3e, mat.

COMPLETIONS

Hinds County—Royal Oil Co.'s (Jackson, Miss.) Hinds Junior College 1, sec 33-5n-2w, Midway 5140 ft, chalk 5310 ft, black shale 6428 ft, abnd 7647 ft in sand and strks shale.

Holmes County—Exchange Oil Co.'s W. M. Thurmond 1, sec 21-15n-3e, elev 245 ft, Midway 2312 ft, Cretaceous 3100 ft, Eutaw 3896 ft, abnd 5003 ft.

Scott County—E. L. Martin's (Oklahoma City) Newell Mineral Lease Co. 1, sec 25-8n-6e, Wilcox, 1225 ft, Selma 3815 ft, Eutaw 5035 ft, electric log, abnd 6370 ft, shale.

Wayne County—Hill & Hill's (Fort Worth) Kalmia Realty Co. 1, c sw ne 5-7n-9w, elev 289 ft, chalk 5141 ft, electric log, abnd 6723 ft (probably Eutaw).

NEBRASKA
FIRST REPORTS

Nemaha County—J. O. Isaacs et al's Lehr 1, sec 25-5n-14e, lcn.

Richardson County—Harry Harper et al's Seibbernsen 1, se ne nw 20-1n-16e, rur.

OKLAHOMA
FIRST REPORTS

Carter County—Batson et al's Williams 1, swc ne 20-4s-2w, lcn.

Hughes County—Walker et al's Hawthorne 1, swc se 19-7n-10e, td 415 ft, testing.

Kiowa County—Burke et al's Morgansen 1, nwc sw 6-2n-16w, dr 315 ft.

Kay County—Armer et al's Deimar 1, ne nw sw 28-27n-1w, rig.

Oklahoma County—Continental's Redmond 1, sec ne 24-14n-4w, dr.

Osage County—Mid-Continent Pet. Corp.'s Osage 1, nwc ne 18-24n-5e dr.

Pottawatomie County—Berry Brothers' Evans 1, sec ne 17-10n-5e, old well retested, td 4792 ft, to perf Hunton 4585-4614 ft.

Tillman County—Daley Oil Co.'s Bryant 1, swc nw 33-2s-17w, lcn.

COMPLETIONS

Carter County—Gibson & Jennings' Griffin 1, se nw se 20-4s-2w, between Healdton and Hewitt pools, so 1745-75 ft, so 2004-14 ft, hfw, abnd 2014 ft.

Comanche County—J. C. Jenkins' Whitehead 1, nec 3-1s-13w, n Holiday, abnd 505 ft.

Okfuskee County—C. A. Yoakam et al's Long 1, csw se 32-12n-9e, 5 mi e Dill pool, top Hunton 3771 ft, td 3926 ft, 7-inch 3762 ft, 7,000,000 cu ft gas.

Pottawatomie County—Alma Oil Co.'s Harrington 1, nw se nw 24-9n-4e, sw of West Earlsboro pool, Hunton 4210 ft, td 4510 ft, pb 4438 ft, 3000 gals acid, 75 bbls 36.8-gr. J. W. Meazel's Billington 1, se ne ne 26-9n-4e, sw of West Earlsboro pool, perf 51 shots 4196½-4214½ ft in Hunton lime, td 4508 ft, pb 4399 ft, 1000 gals acid, 70 bbls 37-gr. Taber & Coleman et al's McKinney 1, c e½ se sw 11-10n-4e, e of Shawnee pool, Oswego 3730 ft, Earlsboro 4115-30 ft, Brown lime 4340 ft, Miss. Caney 4445 ft, Mayes 4580 ft, Woodford 4718 ft, Hunton 4750 ft, Sylvan 4840 ft, Viola 4908 ft, Dense 4960 ft, Dolomite 4965 ft, first Wilcox sand 4903 ft, second Wilcox sand 5081 ft, abnd 5088½ ft.

SOUTH TEXAS
FIRST REPORTS

Atascosa County—H. M. Hill's Campbell Hrs 1, blk 2, G. Mason sur 128, mir.

Duval County—Forest Dev. Corp.'s Rogers 1, n 240 ac, J. Pointevent sur 275, lcn. Providence Oil Corp.'s Driscoll 1, s½ nw¼ I&GN sur 138, 3 mi sw Driscoll fld, 6 mi nw Realitos, lcn.

Jackson County—Humble's Mauritz Bros. 1, Gaines Fig Orchards subd, Morris & Commings sur Ab-243, 6 mi se Ganado, 1 mi sw Mauritz, dr 1475 ft. John G. Mayo and E. R. Kirkpatrick's Tucker 2, se 40-ac of lot 6, McCorry subd, Ramon Musquez gr, ab-59, ¾ mi se Mayo 1, 1 mi nw West Ranch fld, ru.

Jim Wells County—H. H. Howell's Schumacher 1, 280.5-ac tr, J. Poitevent sur, Ab-214, n Wade City fld, crg 5023 ft.

Live Oak County—Beacham & West's Raschle 1, 1082.8-ac tr, SM & S sur 1, part

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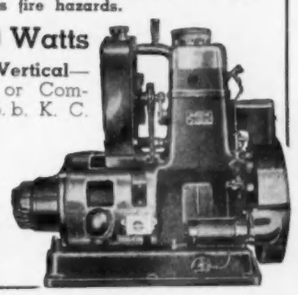

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of S M & S sur 3 & Mark Killery sur, 7½ mi nw Three Rivers, lcn.

McMullen County—Cities Service's Rhode 1, sw¼, Seale & Morris sur 13, 3 mi n Rhode fld, dr 650 ft; Rhode 2, se¼, L. W. Snowden sur 20, 3 mi e & n Rhode fld, lcn.

Nueces County—Humble's Texas 1, state tr 723, Nueces Bay, 2½ mi s E. White Point fld, mir.

Refugio County—Norsworthy Prod. Co.'s Fagan 1, Nicholas Fagan sur a-25, 1½ mi nw Gagan fld, dr 6015 ft.

Starr County—Denzil Oil Co.'s (Glen Harroun) Seabury 1, blk 6, sh 46, por 80, Juris. of Camargo, 6 mi n Rio Grande City, so 1341-46, td 1346, ran dst, no details. A. A. Kelley's Higino Gonzales 1, 37-ac tr, pors 71 & 72, Mier Juris, sh 62, 9 mi n Roma, lcn.

COMPLETIONS

Calhoun County—Eura B. Oil Co.'s Traylor 1, sec 3, I&GN sur, ½ mi s Green Lake, abnd 7507 ft.

Caldwell County—Rutland Oil Co.'s Stacey 1, 310.5-ac tr, Eason Tyson sur, 5 mi sw Lockhart, abnd.

Colorado County—Shell's Plow Realty Co. 1, Obed K. Winn sur Ab-590, 3 mi se Sheridan, 5½-in csg 8339 ft, osd 8121-60 ft, comp. pot 359 bbls ¼-in ch, perf 8138-43 ft, td 8339 ft.

Duval County—J. W. Gormon & C. E. Yoakam's Duval County Ranch Co. 1, G. C. & S. F. sur 193, 2 mi w Colmena fld, abnd 2306 ft.

Guadalupe County—Wellington Oil Co.'s Mauerman 1, 2661-ac tr, Joseph De La Baume sur, 2 mi s Darst Creek fld, abnd 3648 ft.

Jim Hogg County—R. A. Welch's Lopez et al 1, 1 mi s Colorado fld, abnd 3514 ft.

Jim Wells County—Henshaw Bros.' Wendt 1, blk 4, sh 7, Geo. H. Reynolds sur, ab-389, 4000 ft sw Wade City fld, 12 mi n Alice, 5½-in csg 4939 ft, Bierstadt sd 4806-17 ft, McNeil sd 4909-16 ft, td 4940 ft, comp, flwd 168 bbls 11/16-in ch, perf 4905-10 ft.

Kimble County—Austin Bridge Co.'s Wilkinson 1, sec 24, Brooks & Burleson sur, 13 mi nw Junction, temp abnd 832 ft.

Live Oak County—H. F. Baker's Sanders 2, 220.4-ac lse, Stephen Hays sur, 2½ mi w Whitsett, 900 ft s No. 1, temp abnd 1076 ft. W. R. Quin & E. J. Biscamp's Bodo & Paula Stolze 1, 401.5-ac tr, Joseph F. Houser sur 31, ab-221, abnd 2018 ft. Sinclair Prairie Oil Co.'s Hamilton 1, Hooper & Wade sur 119, abnd 4514 ft.

Medina County—Great Southern Expl. Co.'s Muennink 1, Peter Elchorn sur No. 5, 320-ac tr, 2 mi n Dunlay, abnd 744 ft.

Refugio County—Norsworthy Prod. Co.'s Holeman 1, 1254-ac lse, Michael Riley sur A-57, 1 mi ne Fagan fld, td 6509 ft, comp as dry gasser, 5/32-in ch, perf 2108-18 ft.

Starr County—George R. Boyle et al's Standard Trust Co. (E. B. Carruth) 1, sh 1-B, por 9192, Juris. of Camargo, 12 mi ne Rio Grande City, 1200 ft ne Vice Carruth 1, 1526.7-ac tr, 5½-in csg, 3505 ft, td 3505 ft, comp flwg abt 100 bbls 46.3-gr oil, 7/64-in ch, perf 3491-98 ft with 20 shots. Magnolia's Guerra 3, Santa Cruz gr, 10,550 ft ne No. 2, abnd 6640 ft.

Victoria County—British American Oil Co.'s Warden 1-B, Edward McDonough sur ab-88, 40-ac tr, 14 mi sw Victoria, 1 mi se Terrell 1, 1000-ac blk, abnd 5707 ft. Colton & Colton's Fimbel D-1, T&NO sur 3, ¾ mi n discovery, sun farmout, abnd 4336 ft. Maryland Oil Co. et al's Kolle 1, 500-ac tr, Caciano Sambravo sur, ab-103, 3½ mi se Telferner pool, 2½ mi ne Telferner townsite, abnd 3510 ft.

Williamson County—H. C. Lefors & Richardson's Kutsehback 1, 192-ac tr, P. J. Mahon sur 115, 6 mi ne Taylor, abnd 848 ft.

Zapata County—J. P. (Mike) Martin's Vela 1, lot 59, subd of sh 2, El Grullo gr, 7 mi s Comitas fld, 5 mi w Charco Redondo, abnd 3511 ft.

TEXAS GULF COAST

FIRST REPORTS

Chambers County—Humble's State 1-288, 17 mi se La Porte, Galveston Bay, lcn.

Hardin County—Hines' Merchant 1, Jackson sur, 1 mi w Sour Lake, lcn.

Harris County—Steger's Trahan 1, 4 mi se Humble, Ruhl sur, lcn. Titantic Oil Co.'s Weary 1, Hillje area, lots 20-21 Farrias sur, lcn.

Jefferson County—Merrimac's State 1, State tract 62, Gulf of Mexico, 50 ft e Harwell's State 1, lcn.

Wharton County—Eura B. Oil Co.'s Hamburger 1, Glen Flora area, lcn, Texas' Peters 2, ETRR sur, Hillje area, lcn.

COMPLETIONS

Calhoun County—Eura B. Oil Co.'s Traylor 1, Green Lake prospect, abnd 7507 ft.

Chambers County—Standard of Texas-Salt Dome's State 61, Tract 54, Fishers Reef area, 7 mi e Cedar Point, abnd 9538 ft.

Fort Bend County—Fabriguex & Sacks' George 1, Polley sur, lcn abnd.

Galveston County—Stanolind's Hulen 1, Alta Loma area, Asa Brigham sur, 450 bbls 34-gr oil daily, 9961 ft.

Grimes County—E. R. Coker's Freund Est. 1, O'Connor sur, Carlos area, abnd 2939 ft.

Liberty County—Welch and General Crude's Kirby 1, Duncan sur, 1 mi w South Esperson, abnd 7507 ft.

NORTH TEXAS

FIRST REPORTS

Clay County—John E. Farrell's Malone 1, T&NO sec 12, A-828, abnd 5552 ft, co to deepen.

Young County—J. F. Smith et al's Wolf 1, TE&L sec 283, lcn.

Baylor County—Hattie B. Madden's James 1, T&NO sec 150, abnd 1250 ft. R. T. Myers et al's Fancher-Portwood 1, H&TC sec 19, blk 45, jkd 600 ft.

Clay County—E. N. Costley-Bell O. & G. Co.'s Bevering 1, nwc s½ blk 4, BBB&C sur, A-384, abnd 2505 ft.

Throckmorton County—Walter Neustadt et al's R. A. Brown 1, TE&L sec 1608, abnd 727 ft; Brown 3, TE&L sec 1608, abnd 702 ft. E. F. Scott et al's Beatty 1, TE&L sec 1184, abnd 1005 ft.

Wichita County—Hedrick Oil Co.'s Cooper 2, lot 5, H. Hastle sur, A-92, abnd 1338 ft.

WEST CENTRAL TEXAS

FIRST REPORT

Stephens County—J. F. Schwind, Jr., et al's Compton 1, sw T&P sec 34, blk 7, mim.

EAST TEXAS

FIRST REPORT

Limestone County—S. J. Taylor-Lytle & Phillips' Reid 1, 117-ac tr, Pedro Varella league, rig for deep test nw edge Mexia field.

COMPLETIONS

Smith County—Carmerson Corp.'s Simpson 1, sec of 1234-ac tr, Robert Walters sur, Woodbine series 4872 ft, red beds 4987 ft, abnd in Georgetown lime 5508 ft.

Van Zandt County—J. B. Daniel et al's Odom 1, J. Garcia sur, elev 411 ft, Pecan chalk 2115 ft, Austin 3023 ft, abnd in water sand 4032-38 ft.

WEST TEXAS

FIRST REPORTS

Andrews County—Atlantic Ref. Co.'s University 1-2, cse se sec 2, blk 11, rig; University 1-23, c ne ne sec 23, blk 11, mim.

Howard County—C. T. McLaughlin & Co. et al's Johnson 1, cn½ ne ne T&P sec 34, blk 32, T-1-N, lcn.

Yoakum County—Plymouth Oil Co.'s Brownfield-Amerada 1, cne sw sec 620, blk D, J. H. Gibson sur, mim.

COMPLETIONS

Ector County—Ochiltree & Bert Robinson's Johnson 1, nwc 112-ac tr, T&P sec 32, blk 42, T-2-S, elev 2904 ft. Yates frosted grains 2960 ft, solid lime 4100 ft, abnd in sul w 4320-40 ft.

Hudspeth County—Haymon Krupp O. & L. Co.'s Thaxton 1, sec ne se T&P sec 34, blk 74, tsp. 6, abnd 6402 ft.

Tom Green County—B. C. Mann et al's Funk 1, ne nw ne H&TC sec 32, blk 5, elev 2417 ft, pb from 1562 ft, acidized pay 1121-29 ft, pump 61¼ bbls, oil head 18½ hrs, est 20 bbls daily, 33-gr.

Winkler County—Gulf's Scarborough 1-A, sec PSL sec 7, blk C-22, elev 2976 ft, salt 1191-2462 ft, brown lime 2560 ft, Yates 2648 ft, abnd 4276 ft.

Order Semi-Annual Gas/Oil Ratio Tests for K-M-A

Semi-annual gas/oil ratio tests for wells in the K-M-A field, Wichita County, were ordered by the Texas Railroad Commission last week. The first tests must be made in June and July, with reports to be on file in the Wichita Falls office of the commission by July 15.

The second survey is to be made in December, 1940, and January, 1941. The test must be made under normal producing conditions and while the well is producing at a rate that does not vary more than 10 percent from the rate of flow provided in commission proration orders.

Chapel Hill Gets 40-Acre Spacing

Forty acre spacing for wells in the Chapel Hill field, Smith County, is provided in an order issued by the Texas Railroad Commission last week. Wells may be located 330 feet from lease lines, but must be 770 feet apart. Proration is on acreage and per well, with 50 percelt allocated on each factor.

NOTES FOR THE Equipment Buyer and User

Gasoline Engine

INTERNATIONAL HARVESTER COMPANY

Two additions to a recently-announced Model U-2, 4-cylinder, 22-horsepower gasoline power unit have been added to the line by International Harvester Company, 180 North Michigan Avenue, Chicago. Both 4-cylinder engines, Model U-4 is rated at 31.5 horsepower, and Model U-6 at 41 horsepower.

Both new units are of valve-in-head design, have replaceable cylinder sleeves, replaceable precision-type bearings, Tocco-hardened crankshafts, and pressure lubrication. Maximum horsepower for the U-4 and U-6 are 31.5 and 41 at governed speeds of 1800 and 1500 r.p.m. respectively. The bore and stroke of the U-4 are respectively 3⅜ and 4¼ inches; of the U-6 3⅞ and 5¼ inches. Piston displacement of U-4 is 152.1 cubic inches, and of the U-6 247.7 cubic inches. The U-4 is 54¾ inches long, 23-7/16 inches wide and 40 inches high and weighs approximately 920 pounds. The U-6 is 62-9/16 inches long, 25⅜ inches wide and 50¾ inches high and weighs approximately 1400 pounds.

Pump Clutch Drive

GRANBERG EQUIPMENT COMPANY

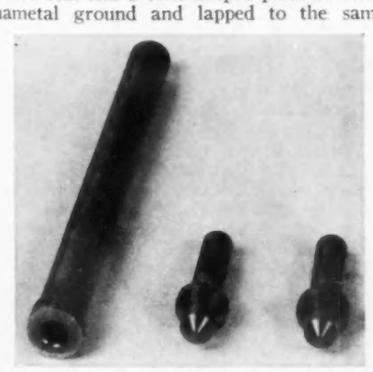
An automatic clutch drive for truck pumps designed to meet the need for different pumps operated from limited power take-off facilities has been announced by Granberg Equipment Company, 4068 Holden Street, Oakland, California.

The unit, measuring 17 inches overall and weighing 20 pounds, requires a reversible power-take-off. One pump operates when the take-off is running forward, and the other when it is in reverse motion. One pump is idle while the other is working. The unit is assembled complete with two over-running clutches, each with sprocket attached, shaft and shaft bearings. Additional flexibility may be had by varying the size of sprocket on the pump.

Valve

McKENNA METALS COMPANY

A new valve, designated a slow-up valve, with a ring of Kennametal inserted in the valve seat and a cone-shaped piece of Kennametal ground and lapped to the same angle of chamfer, has been announced by McKenna Metals Company, 224 Lloyd Avenue, Latrobe, Pennsylvania.



McKenna Metals' Kennametal Valve

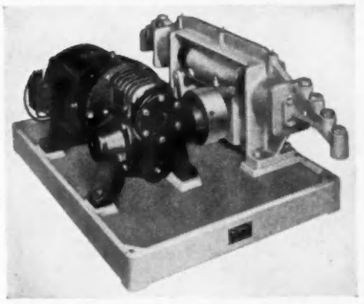
Described as resistant to both erosive and corrosive action, they are designed for use in the oil industry where oil containing sand exerts severe wear on valves, in the gas industry where corrosive gases are encountered, in the chemical industry for use in acid-proof pumps and similar equipment, and in other industries where resistance to abrasion and corrosion is important.

Kennametal, in grade KH, has a rated hardness of 78 Rockwell C or 91 Rockwell A, and is described as sufficiently strong to enable valves on which it is used to resist breakage while in service.

Pump

MILTON ROY PUMPS

A new opposed-type duplex chemical pump with a rated capacity of 4 gallons an hour against a pressure of 3000 pounds has been announced by Milton Roy Pumps, 3160 Kensington Avenue, Philadelphia. A one-horsepower explosion-proof geared motor and the pump are an integral unit, and the pump has double-ball check-valve construction for both suction and discharge chambers.



Milton Roy Duplex Chemical Pump

The unit is designed to eliminate air-binding and to automatically discharge small particles of dirt to make the pump self-cleaning. Pump plungers, ball checks and ball seats are of stainless steel.

The pumps are furnished to pump against pressures up to 20,000 pounds and are intended to handle alkalis, oil solutions, sulphuric acid concentrations, chlorine solutions, hydrochloric and phosphoric acids and other liquids and chemicals. They may be used for pumping two or more chemicals simultaneously, or on separate feed to two or more points of delivery.

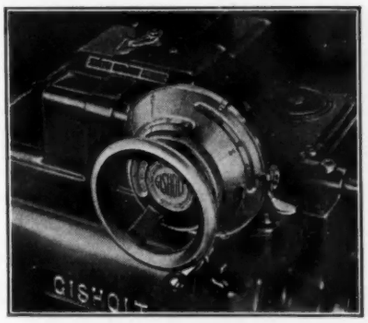
Switchgear

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania, has issued a 16-page booklet on metal-enclosed switchgear. It gives data and illustrations on indoor metal-clad, indoor and outdoor oil-filled metal-clad, horizontal draw-out truck- and cubicle-type switchgear. Standards covering design and manufacture, adopted by the National Association of Electrical Manufacturers, are also listed. The publication is designated 32-100.

Lathe Speed Selector

GISHOLT MACHINE COMPANY

A speed selector for use with its turret lathes, designed to reduce floor-to-floor machining time, has been announced by Gisholt Machine Company, Madison, Wisconsin.



Gisholt's Lathe Speed Selector

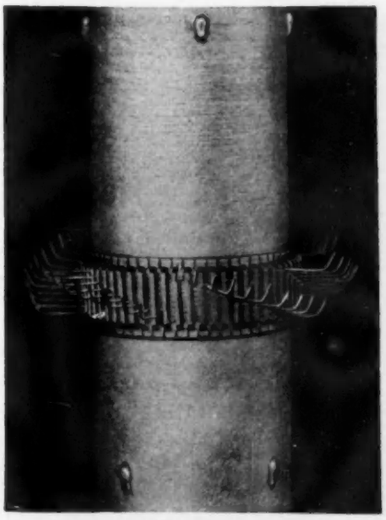
In operation, a turn of the speed selector dial to the graduation corresponding to the diameter of the work automatically shifts the machine to the spindle speed producing the correct cutting speed for that diameter. A power-operated device, it permits selection of any of 12 available spindle speeds, and the change is accomplished without slowing down the machine.

Wall Cleaning Guide

B & W, INC.

A wall cleaning guide to center casing in the drilled hole, to remove the mud filter cake from the wall of the hole during the cementing of blank casing above or through the oil zone, or to land perforated casing in the producing section, has been announced by B and W, Inc., 3545 Cedar Avenue, Long Beach, California.

The device combines a centering action



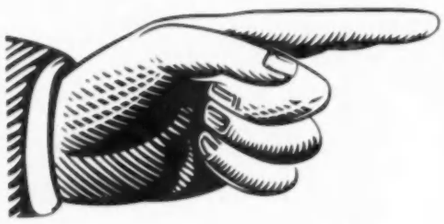
B & W Wall Cleaning Guide

NOTES FOR THE Equipment Buyer and User

with a means of removing the mud filter cake from the wall of the hole so that the cement is in bond with the formation. It is installed on the casing opposite shale sections above and below productive sands so that movement of the casing during the cementing operation will remove the mud cake and enable the cement to be uniformly distributed behind the casing. Where blank casing is cemented over productive sands or as a protective string to prevent gas blowouts, the guides are designed to obtain proper cement distribution around the lower casing joints.

Installed between gravel-packed liner sections, they are to center the liner and remove mud which would interfere with the effectiveness of the liner. In selective completion with production obtained by perforating, the guides are placed on the casing opposite productive sands as indicated on the log.

THE BIG TOOLPUSHER FOR THE BIG JOB!

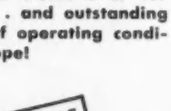


"SPECIAL": Capacity 630,000 lbs.

THE MEDIUM TOOLPUSHER FOR THE MEDIUM JOB!

"CLIPPER": Capacity 480,000 lbs.

AND THE LITTLE TOOLPUSHER FOR THE LITTLE JOB



"SLIM HOLE": Capacity 150,000 lbs.

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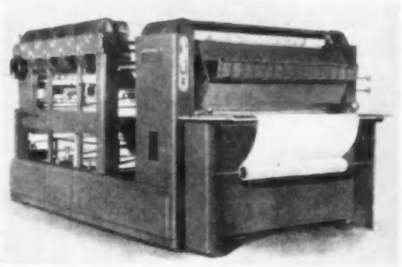
Blue Print Machine
THE C. F. PEASE COMPANY

A new blue printing, washing and drying machine, designated Model 22, has been announced by The C. F. Pease Company, Chicago.

The machine utilizes arc lamps controlled through a new switch arrangement that permits them to operate at any one of three speeds, as desired. The washer comprises three horizontal water tanks upon which the paper floats



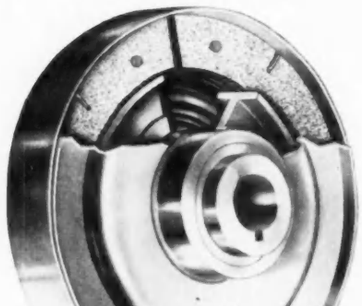
Pease Model 22 Blue Printer

as it is washed. The action is described as eliminating tension wrinkles and distortion. Nine aluminum drums are used to dry the paper. Potash and hypo application is interchanged by a lever control.

Capacity of the machine is rated at 24 linear feet per minute on D. C. current and 18 linear feet on A. C. current for large tracings.

Clutch
MERCURY CLUTCH CORPORATION

A new clutch designed to permit a driving motor to gain speed before assuming load has been announced by Mercury Clutch Corporation, 637 West Third Street, Massillon, Ohio.



Mercury Clutch

Utilizing mercury to displace friction segments by centrifugal force, the clutch gradually picks up the load at full speed and permits smaller motors to be used when starting under load. Present standard sizes are 4- and 4½-inch, rated to transmit loads up to 5-horsepower. Other sizes are available on specification.

Four principal parts comprise the clutch: the driving member or housing, the driven member or inner drum, the clutch segments, and the mercury. The latter is introduced or removed through filler holes. In operation, the mercury displaces the clutch segments inward,

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. . . Say Operating Officials

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gives you a practical cost-reducing tool you can put to work at once!

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For the operating official who is seeking a means to reduce costs and increase profits, here is something *definite* that can be done — at once! Write for your free copy of the booklet which explains this money-saving service.

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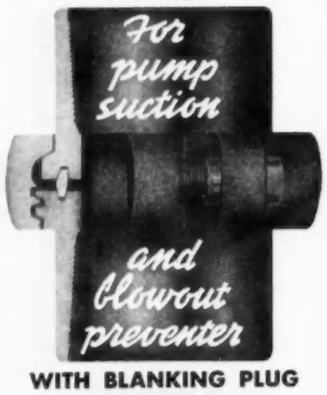
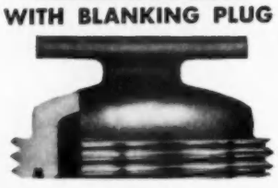


WITH BLANKING PLUG



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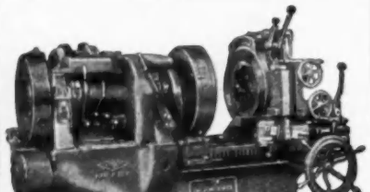

New Landis 4¾ Receding Chaser Pipe Threading Machine

COMPLETE LINES

Machine Tools—Metal Working Machinery—Bolt and Pipe Threading Machines—Electric Arc Spot and Butt Welders—Hand Power and Electric Traveling Cranes—Foundry and Forge Shop Equipment.

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THE GULF PUBLISHING COMPANY
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NOTES FOR THE Equipment Buyer and User

where they engage the drum. A positive drive is effected when the speed of the housing and driven drum are synchronized. The capacity of the clutch limits the torque transmitted, and overloads and other shocks are not transmitted through the clutch to the prime mover. The unit is described as operating equally well in a vertical or horizontal position.

Maps

A base map of the United States, offered in nine sheets on a scale of 1 to 1,000,000, or approximately 1 inch to 16 miles, has been announced by George F. Kelly, Kennedy Building, Tulsa. It is drawn on Albers equal-area projection to provide a minimum or areal and scale distortion in projecting so large an area of the earth's curved surface upon a flat map.

Described as suitable for regional geologic studies, the map shows counties, county seats, townships and ranges, principal meridians and base lines, grants, and other base information compiled from latest federal, state and private sources. Areas along the Canadian and Mexican borders are tied in to data from official maps of those governments.

A special county-outline edition shows only counties and county seats, without townships, and other special editions can be furnished showing oil and gas fields, oil and gasoline pipe lines and refineries, and special geologic compilations.

First Aid Kit

E. D. BULLARD COMPANY

A new cylindrical first aid kit equipped with a wall bracket which allows removal for transfer to a scene of emergency has been announced by E. D. Bullard Company, 275 Eighth Street, San Francisco.

A canvas roll-up, containing unit packages of first aid dressings and treatments, may be inserted into the kit without removing it from the wall. Made of drawn aluminum, the kit is 4½x11½ inches, and is furnished complete with bandages, compresses, ointments, inhalants, tweezers, scissors and instruction book.

Bullard's Cylindrical First Aid Kit

Richardson Made Dallas Manager for Allis-Chalmers Manufacturing

A. I. Richardson has been appointed manager of Allis-Chalmers Manufacturing Company's district office at Dallas, according to Walter Geist, vice president. He was previously located at the company's district office in Charlotte, North Carolina.

A. I. Richardson

Richardson, a native of Texas, attended public schools of McKinney, and graduated in mechanical engineering from Texas A. & M. College. He entered the company's employ in 1925, spending two years in their shops prior to preparing for sales engineering work. Since then he has been stationed at the company's district offices at Atlanta, Georgia, Chattanooga, Tennessee, and Charlotte.

Cameron Names Jack Howe, Jr. Southwest Texas Representative

Jack Howe, Jr. has been made sales representative in Southwest Texas for Cameron Iron Works, Inc., Houston. He has made his headquarters in Corpus Christi.

Jack Howe, Jr.

J. B. Reilly, president of Fluid Packed Pump Company, Los Niejtos, California, with his family, visited in Houston last week while en route to the Rotary International convention in Havana, Cuba. Reilly is governor of Rotary's District 108, comprising groups in Southern California.

Tubing Heads

The National Supply Company, Pittsburgh, has issued Bulletin No. 262 describing its Types DH-1 and DH-1A tubing heads. The units are made for use on light flowing and pumping wells for depths up to 5500 feet, and are available for 500- and 1000-pound working pressures.

Electrical Equipment

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania, has issued a new edition of its Catalog No. 30-000, titled "Quick Selector," prepared to facilitate selection of correct apparatus for any motor, lighting or feeder circuit. Sections feature safety switches, no-fuze breakers, multibreakers, distribution panelboards, motors and motor controls.

NOTES FOR THE Equipment Buyer and User

Moody Completes 50 Years With Jarecki Manufacturing

A. A. Moody, vice president and general manager of branches for Jarecki Manufacturing Company, was guest at a gathering of branch and district managers at the main plant in Erie, Pennsylvania, May 31, the event marking his completion of 50 years with the company.

Homer V. Engle, who has been with the company for more than 57 years, was oldest in point of service among those attending the gathering.

A. A. MOODY

Anchors Named Air Reduction Manager at Oklahoma City

E. H. Anchors, former branch manager for Air Reduction Sales Company at Atlanta, Georgia, has been appointed manager of the Oklahoma City district. Anchors began his career 15 years ago with the Commercial Acetylene Supply Company, and was southern manager of this company when it was acquired by Air Reduction Sales Company. Since that time he has served continuously as branch manager at Atlanta.

E. H. ANCHORS

Hal R. Roodhouse Company Organized in Export Field

Hal R. Roodhouse has resigned as export manager for Pomona Pump Company to organize Hal R. Roodhouse Company as an export representative with offices in the Chamber of Commerce Building, Los Angeles.

The company will specialize in handling water well drilling machinery, well casing, line pipe for transmission of water and gas, and a general line of well drilling tools, equipment and supplies.

Among manufacturers represented are Roscoe Moss Company, Los Angeles, and Southern Pipe and Casing Company, Azusa, California.

HAL R. ROODHOUSE

E. R. Smith Goes to South America for Lane-Wells

E. R. Smith, of Lane-Wells Company's export sales department, Los Angeles, has left for a 60-day trip through Colombian, Venezuelan and

E. R. SMITH

One Gallon Protects
7,000' of 2½" Tubing

By applying RECTORSEAL to the "field end" of new tubing, as joints are made up, many operators are now preventing costly leaks. They're increasing old pumper production by doing the same thing with old tubing, as rerun. They're also specifying to the pipe mill that the "mill end" be treated with RECTORSEAL as collars are put on. It's a proven success on both tubing and casing threads. Write NOW for descriptive booklet to RECTOR WELL EQUIPMENT CO., INC., Ft. Worth, Texas. Buy RECTORSEAL from your Supply Store in container size to meet your needs.

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CHEMICAL DRILLING MUD THINNER
—ECONOMICAL AND EFFICIENT
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For information, communicate with the manufacturer, or consult your nearest supply company handling Lo-Vis Crystals.
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NOTES FOR THE Equipment Buyer and User

Trinidad fields. He will first visit the company's New York office, and then embark for Miami. The entire trip will be made by air, and the return will be through Central America and Mexico.

Worthington Awarded Contract For Atlantic's Tanker Pumps

The Atlantic Refining Company has awarded to Worthington Pump & Machinery Corporation contract for cargo discharge and condenser circulating pumps for a 19,405-ton all-welded tanker to be built at the Sun Shipyards, Chester, Pennsylvania. Delivery is scheduled for the summer of 1941.

The three 300-horsepower cargo pumps will be of the centrifugal, deep-well type, driven by 2300-volt explosion-proof motors. Combined capacity will be 630,000 gallons an hour.

It's a Fact — Johnston

ILLINOIS, THE NATION'S NEWEST MAJOR OIL PRODUCING STATE, PROVIDED BIRDS WITH A COMFORTABLE PLACE TO KEEP WARM THIS WINTER. INSTEAD OF FLYING SOUTH, THOUSANDS OF BIRDS GATHERED AT THE SALEM FIELD, WHERE THE SCORES OF GAS FLARES KEPT THE TEMPERATURE 30 TO 40 DEGREES ABOVE NORMAL. THOUGH BELOW-ZERO WEATHER OFTEN PREVAILED NEARBY, THE HEAT FROM THE FLARES KEPT THE GRASS IN THE FIELD GREEN ALL WINTER, WHILE THE TREES AND BUSHES BEGAN TO BUD TWO MONTHS IN ADVANCE OF SPRING. ALL BECAUSE OF UNUSUAL TEMPERATURE CONDITIONS!

BUT, SPEAKING OF TEMPERATURES, DID YOU KNOW THAT EVERY JOHNSTON FORMATION TEST GIVES YOU A TEMPERATURE RECORD OF YOUR WELL? THE PRESSURE RECORDER, RUN AS A PART OF EVERY JOHNSTON TEST IN DOMESTIC FIELDS, RECORDS – IN ADDITION TO PRESSURE – THE MAXIMUM BOTTOM-HOLE TEMPERATURE. IT SUPPLIES ACCURATE, SCIENTIFIC, UP-TO-THE-SECOND INFORMATION ON WELL PRESSURE, POTENTIAL, ETC.. – PROVIDING AN EFFICIENT GUIDE FOR DEVELOPMENT OPERATIONS. THE INFORMATION FROM THE TESTING TOOL AND RECORDER TOGETHER GIVE YOU A COMPLETE SUB-SURFACE PICTURE OF THE WELL, VALUABLE FOR BOTH PRESENT AND FUTURE DRILLING PROGRAMS.

JOHNSTON PRESSURE RECORDERS ARE DESCRIBED IN COMPLETE DETAIL IN THE ENGINEERING BROCHURE THAT TELLS ALL ABOUT JOHNSTON TESTING METHODS AND EQUIPMENT. WRITE TODAY . . . ASK FOR BROCHURE 36. THERE'S NO OBLIGATION.

Johnston

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"Servicing California and Selling Exclusively Foreign"

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HOUSTON, TEXAS
"Servicing Mid-Continent and Gulf Coast"

"WHY SET CASING BEFORE YOU KNOW!"

Lincoln Electric's A. F. Davis Made Chief Fleetweld of Osages

Until the evening of May 22, he was just A. F. Davis, vice president and secretary of The Lincoln Electric Company, Cleveland, but that night at eight he became "Chief Fleetweld" of the Osage Indian tribe.

It happened during the International Petroleum Exposition at Tulsa. Having accepted an invitation to a meeting of the Fusion Welding Forum, Davis was listening attentively to the principal speaker whose opening remarks went something like this:

Chief Fleetweld of the Osages

"Fellow members, we have with us this evening a man who is known far and wide in welding, having spent 25 years in the industry. He is a combination manufacturer, author, editor and advertising man. He knows probably more welders than any other man in the world and is loved and respected by all.

"It is a great honor for us that he is here tonight and it gives me great pleasure to present him a slight token of our esteem and of our appreciation for his unbounding enthusiasm for welding. Although his initials are A. F., everyone calls him Charlie.

"Mr. Davis, will you kindly step forward?"

Whereupon, Davis, taken entirely by surprise, walked to the platform to be presented with a tomahawk and a head gear of the Osage Indian tribe, thereby being inducted into the Fusion Welding Forum as fitting honor for his long service to the welding industry.

In the presentation, Davis was named "Chief Fleetweld" and the tomahawk was referred to as "the first chipping hammer," the difference between it and the modern chipping hammer being that the latter is used to chip welds instead of skulls.

Valves

Manning, Maxwell & Moore, Inc., Hancock Valve Division, Bridgeport, Connecticut, has issued Bulletin No. 5-7000 covering dimensions of all types of its valves and material specifications of all metals used in valves. Illustrated with photographs and line drawings, the booklet's 40 pages also include A.S.M.E. service-rating tables.

Squeaks from the Bull Wheel

Quite Rude About It

Grace, is that sweetheart of yours an auctioneer?

No, father. Why?

Because he keeps on saying he's going—going, but he hasn't gone yet.

Less Shoe Expense

Won't you marry me, Elinor?

You couldn't keep me in the shoes I've been accustomed to.

Well, of course, I'd expect you to cut out walking back after we were married.

Explained

See that loving couple in that parked car? They've been married for ten years.

Really?

Yes, but not to each other.

Different

What, mamma, is all that pie for grandpa?

No, my son; that's for you.

Oh, want a little bit!

Started Early

Why doesn't baby talk, father?

He can't talk yet, dear. Young babies never do.

Oh, yes they do. Job did. Nurse read me out of the Bible how Job cursed the day he was born!

Answer for Dad

I never smoked when I was your age. Will you be able to say that to your son, when you are my age?

Not with as straight a face as you do.

Unreasonable

Tommy, what's the matter with your little brother?

He's crying because I'm eating my cake and won't give him any.

Is his own cake finished?

Yes'm; and he cried while I was eating that, too.

A Champion

I hear Fred won a loving cup the other night.

Really? He must have made a big improvement since the last date we had.

One in Every Neighborhood

"Sorry, old chap, but I shall be using my lawn mower this afternoon, and the roller, and the fork."

"Oh, well, I wonder if I might borrow your golf clubs?"

Baby Talk

"Oh, I say, is that a dray horse you have there?"

"No, it's a brown horse and stop that baby talk."

The Voice of the People

I suppose this lake is a great asset to you people here?

Yes, in the winter we get an appropriation to deepen it; that comes under the rivers and harbors bill. And in the summer we get another appropriation to drain it; that comes under the mosquito control act. We believe now we can get a third appropriation to throw up wind-breaks to keep the dust from being blown away.

The One Objection

The shopkeeper was very anxious to sell his prospective customer a dachshund, but the man didn't seem very keen on this type of dog.

"What is it about a dachshund you don't care for?"

"They make such a draft when they come into a room. They always keep the door open so long."

Enough Said

"Look here, young man," said the playwright, "this report doesn't say very nice things about your work at school."

"Well, father, I was reading in today's paper about the play you had produced last night, and—"

"Better have your dinner."

Double Talk

I suppose you have been in the Navy so long that you are accustomed to sea legs.

Lady, I wasn't even looking.

Ouch

First Mosquito—Hooray; here comes a new arrival.

Second Mosquito—Good; let's stick him for the drinks.

Lucky

What is better than being a sailor, with a sweetheart in every port?

Being the sweetheart, with a sailor on every ship.

Daughter's Delight

Well, dear, did you have a good month at the beach?

Splendid! I was given seven engagement rings and I only had to return three of them.

Whatever That Means

"Does it make any difference on which side of you I sit?" asked Aggie upon her arrival.

Not a bit, replied John. I'm ambidextrous.

Flattery Wins

"Darling," he cried passionately, "I will lay my fortune at your feet."

"Oh, but you've hardly got any money at all," she whispered.

"No, but it will look a fortune beside those tiny feet of yours."

She accepted him.

Better Late Than Never

Abel: The wind is rising; we must hug the shore.

Mabel: Maybe you will have nerve enough for that.

Similar

How dare you attempt to kiss me! Do you not know that I am like your telephone?

Ah, my proud beauty! And how do you resemble my telephone?

Because, you brute, you must first ring me before you can place your lips to my mouthpiece!

Undeveloped

My Scotch uncle sent me his picture this morning.

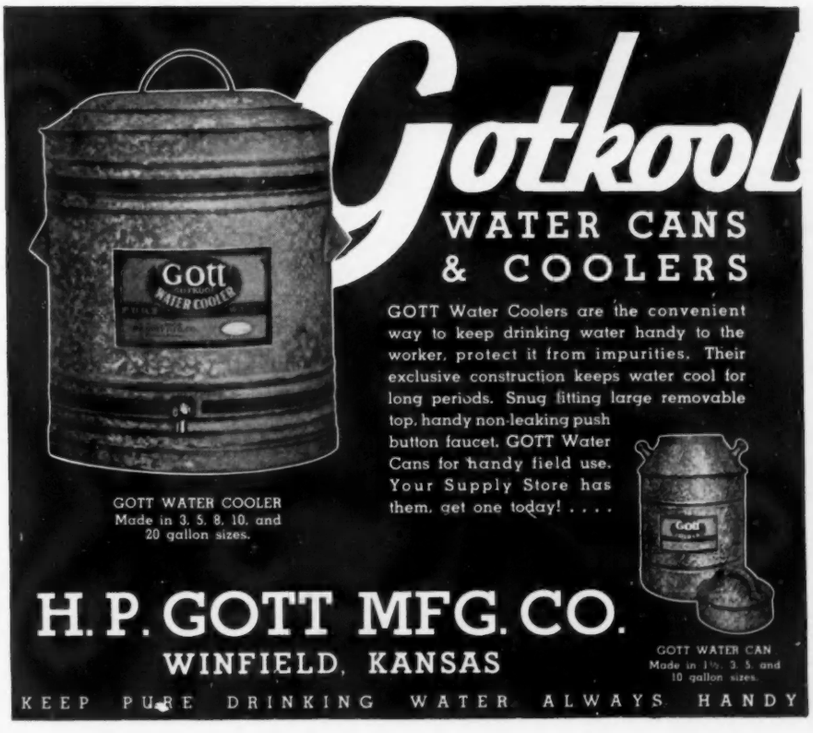
So? How does he look?

I don't know; I haven't had it developed yet.

Liberal

Why did that Scotchman take his son out of school?

He heard that this college believed in a liberal education.



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